MERRY CHRISTMAS
and
A HAPPY NEW YEAR

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FARMERS DIGEST, Fort Atkinson, Wis

The **Farmer's Digest**

Volume 22 December 1958 Number 6

How Pig Crop Reports Are Made

The man most responsible tells how the all-important reports are compiled and why they sometimes "miss" . . .

Condensed from National Hog Farmer

S. R. Newell, Director,
Agricultural Estimates Division, USDA

THE pig crop reports issued by the Crop Reporting Board of the Department of Agriculture have been very much in the public eye during recent months. People naturally want to know how well the reporting service is measuring changes going on in the hog industry.

This article tells briefly how the estimates in the reports are made, how accurate they are, what sometimes causes a "miss," and what needs to be done to make them more accurate, if greater accuracy is required.

The Crop Reporting Board issues two comprehensive pig crop reports each year, one about June 20 and the other about Dec. 20. These reports include estimates, by states, of the number of sows farrowed and pigs saved during the preceding 6-month period, and farrowing intentions for the following 6-month period. Each December the Department publishes a report of farmers' farrowing intentions for the December to May period, and each June a report of intentions for the June-November period.

The purpose of an intentions report is to indicate current plans in time for farmers to review those plans and make changes that appear desirable. These two reports are the basic pig crop reports you have heard so much about.

In addition to the two basic reports, a quarterly report is is-

Reprinted by permission from National Hog Farmer, Grundy Center, Iowa

sued for a number of leading hog producing states that account for nearly three-fourths of the total U. S. pig crop. These quarterly reports have been developed as joint state-federal projects in each of the states concerned. They include state estimates of sows farrowed and farrowing intentions by quarters, and estimates of hogs and pigs on farms by age groups as of the first of each quarter, —December 1, March 1, June 1, and September 1.

But the pig crop reports are only part of the information published by the Crop Reporting Board about the hog industry. Each month a report is issued showing the number and weight of hogs slaughtered in each state.

A comprehensive report showing, by states, the number of hogs on farms on Jan. 1 by age classes is published about mid-February each year. Another annual report brings the inventory, pig crop, and commercial slaughter data together into a balance sheet. This shows, by states, the number of hogs slaughtered on farms, inshipments into the state, death losses, pounds produced, cash receipts from the sale of hogs, and similar statistics.

Data From Farmers

In this article we are concerned mainly with the pig crop reports. The basic data for these reports come from individual farmers and ranchers. Each June and December the 41 field offices of the Agricultural Estimates Division receive about 150,000 survey cards from this source.

Each reporter has shown on his card the numbers of livestock on his farm or ranch, together with detailed information on pigs born, number of sows he plans to have farrow in the next 6 months, calves and lambs born and other related information.

A substantial proportion of the cards were distributed in bulk to rural mail carriers and star route operators in rural areas. The mail carriers and star route operators were asked to distribute the cards so as to give a good average picture or "sample" of all farms on their routes. The distribution by carriers is supplemented in some states by direct mailing to farmers who supplied information the year before.

It takes nearly a ton of water to grow a pound of wheat grain and three-fourths of a ton to grow a pound of clover or corn.

Nine of the leading hog producing states in the corn belt also collect data on sow farrowings from virtually all farmers in the state as part of an annual state farm census.

In most of these states such censuses are made by tax asses-

sors in the spring when farms are visited for tax assessment purposes. In some states assessors mail the forms to farmers. The state census does not ask for pigs saved or farrowing intentions; it is still necessary to get that information from the mailed surveys.

The entire procedure used by the Crop Reporting Board in making its estimates from figures supplied through these various channels cannot be described in a short article.

The principle is briefly this: Starting with inventory figures derived from census data in a census base year, the annual samples provide measures of year to year changes that are supplied each year to the previous year's estimate. Annual state census data, where available, usually cannot be summarized completely before the June pig crop report must be issued, but they do provide a base for truing-up estimates of sows farrowing, later on in the year. They also help to improve current estimates by providing a more accurate base each year to which the change indicated by a current year's sample can be applied. Check data on marketings and slaughter provide a similar function.

More than one-fourth of the dairy cows in the United States now are bred artificially.

How Accurate Are the Estimates?

In December 1954, the Board reported that farmers planned a 5 per cent increase over the previous year in the number of sows expected to farrow during the December 1954-May 1955 period. The actual farrowings later turned out to be up 9 per cent instead of the predicted 5 per cent.

The following year the sample indicated a 2 per cent decrease but the actual reduction was 8 per cent. For both the spring and fall crops of 1957, and for the spring crop of 1958, actual farrowings were less than predicted.

At first glance it would appear that the Crop Reporting Board was not doing too good a job. But we have to remember that the main purpose of an intentions report is to give producers an opportunity to change their plans.

In its estimating procedure, the Board always makes some allowance, based on experience in past years, for the average difference between what farmers said they planned to do and what they actually did. Sometimes additional information can be used to predict the amount by which the final outcome is likely to differ from the reported intentions.

A study made in Iowa some years ago, for example, showed

that farmers tended to exceed their intentions when their corn stocks were high but that they tended to fall short of their intentions when corn stocks were low.

But the important point to notice is that the intentions report by itself can cause the final outcome to differ from the original prediction. Producers are given

Very large apples have a shorter storage life than do medium sized and small apples.

an opportunity to change their plans after they see the report, if they feel that it is to their advantage to do so.

It would be quite a difficult job to find out how much of the difference between the intentions report and the final outcome was caused by changes in intentions and how much was caused by what we call sampling errors. But we can get some indication of the size of the error by looking at revisions that were later necessary in preliminary estimates of hog and pig numbers made immediately after the close of the farrowing season to which the data relate.

During the 10 years from 1948 to 1957, the estimate of sows farrowed in the spring, expressed as a per cent of the previous year, was subsequently revised downward in 7 years and held unchanged in 3. The largest downward revision was 3 per cent—the average, 1.2 per cent. For the fall crops the biggest revision was also 3 per cent with an average of 1.4 per cent.

After the 1954 U. S. Census data were analyzed, the actual estimate of sows farrowed in the spring of 1954 had to be reduced 6 per cent and the estimate of fall farrowings had to be reduced 8 per cent. These figures refer to actual 1954 numbers and not to change from the previous year. Although the errors in the year-to-year changes have been comparatively small, they have tended to be in the same direction every year and the cumulative effect from one census to the next has been large.

The main reason for this is that the number of farms keeping hogs declined more rapidly from year to year than the Board knew. When farmers stop producing hogs, they also generally stop sending in replies to mail

The average farm accident costs 10 days' work and $105 in medical expenses.

questionnaires or to survey cards left in their mail boxes.

The number of "zero" reports mailed in thus fails to give an accurate indication of the number of farms that have stopped producing hogs. By projecting the trend shown by previous censuses,

it is possible to get some idea of the current trend. But with a census being taken only once in 5 years, there is always considerable uncertainty on this point between censuses. In addition to that difficulty, there is also some selectivity in the average inventory numbers per farm for the farms that do return questionnaires; small producers are usually under-represented in the sample. However, uncertainty about the trend in the number of producing farms is believed to be the biggest single factor contributing to inaccuracy in current estimates.

Ideas for Improvement

What can be done to make the estimates better if present methods no longer fill the bill? In states where questions on numbers of hogs have been included in the annual state farm census, the difficulty is largely overcome.

Hybrid corn accounted for 93.8% of all corn acreage planted in the United States in 1958.

In other states, current information on changes in numbers of farms keeping hogs (and other classes of livestock) still needs to be provided. The best way of doing that job requires some revamping of present procedures.

It has already been suggested by the Agricultural Estimates Division as part of a proposed program for modernizing its operations that was submitted to a sub-committee of Congress about 2 years ago. It involves visiting small sample areas, randomly distributed over the important agricultural areas of every state, at least once each year and taking an inventory of all agricultural operations in those sample areas.

Actual estimates of hog numbers can be computed directly from such a sample but a much larger sample is required to obtain accurate direct estimates of hog numbers by that method than would be required for estimates of numbers of farms keeping hogs. But even if the sample were only sufficiently large to provide good indications of numbers of farms keeping hogs in every state, that information could be used with the per-farm averages of hog and pig numbers from present mail samples to provide better estimates.

Furthermore, even though the enumerated sample were not sufficiently large to provide accurate independent estimates of hog and pig numbers by individual states, such samples would still be large enough to provide good regional estimates. Those could be used as a check on the estimates from the mail survey and would provide a basis for some adjustments in individual state

estimates when needed.

Taking Other Steps

The Crop Reporting Board is taking other steps that should be helpful. The possibility of making preliminary tabulations from annual state census records in time for the June pig crop reports, now being prepared only for a limited number of states, could be expanded to include about 16 of the important producing states. If those reports could be expanded to include estimates of pigs saved, as well as sows farrowed, and perhaps estimates of sows farrowed by months, the data would be more useful.

In the final analysis, we should remember that the service exists for the benefit of the same people who are called upon for the information used in compiling the reports. As our interests are intertwined so closely, there is nothing to prevent the service from adapting itself to the changing needs of the times. But it is something that we must all work out together. The cooperative relationships that have existed between us for almost a century augur well for the future.

Warning Issued on Beef Calf Prices

Minnesota farmers were advised this week not to expand or start raising beef cow herds simply because of current high prices for feeder calves.

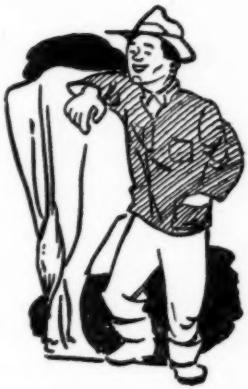
Ermond Hartmans, extension agricultural economist, gives this reason: Present prices for feeder calves—around 35-36 cents per pound—are at or near a peak and can't be expected to be that high in future years. Calves from beef cows added to the herd now may sell for much less two years from now.

Generally, Hartmans explains, feeder calf prices go up and down in 10 or 15-year cycles. While they may go quite high during the peak, as they have this year, they still average out to about 20 cents per pound for the entire cycle.

Hartmans adds that a beef cow herd should be a long-time project. So whether it fits into the farm business should be determined according to long-time feeder calf price averages, not on the high levels of this year.

Long-time records from two farm management associations in Minnesota have shown that beef cow herds on good land simply don't bring as much profit as other forms of livestock when feeder calf prices average 20 cents per hundred.

—University Farm and Home News



How Co-op Milking Barns Work

Answers to questions about the latest development in dairying . . .

Condensed from Wisconsin Agriculturist

CO-OP milking barns are cropping up across the nation. Utah dairymen first came up with the idea of boarding cows at a central barn and hiring someone else to milk them. An Iowa cow pool has been in operation since August 1.

Here are some answers to questions on cooperative milking plans and how they could affect you as a dairyman:

Q. How does the plan work?

A. Each dairyman signs up a definite number of cows and agrees to stay in the cooperative for a specified period of time. A release provision is made if he retires from the dairy business.

Milk cows are boarded at a centrally located barn where employees handle the milking. Dry cows and young stock are kept at the home farm. Cows are on DHIA test, and artificial breeding is used.

Q. What are the advantages?

A. Dairy specialists point out the plan could be "salvation" for the small dairy farm. The small operator selling grade B milk is faced with a costly investment in dairy equipment to qualify for a better market.

Cost of joining a cooperative milking plan would be considerably less. And profits would be higher with a grade A market.

Ten new wonder drugs developed in the past 20 years are credited with saving 10 million lives.

In addition, twice a day milking chores would be eliminated, freeing the dairyman for other farm work or a part-time job. Maintenance and depreciation of an expensive dairy barn are also

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lowered. The plans also stress improved milking practices and feeding designed to stimulate production.

Q. How about the cost of operation?

A. Backers of a Wisconsin project estimate that an investment of $60,000 would be required for buildings, milking equipment and necessary machinery. This cost would be shared by 10 or 15 farmers who subscribe for a share of the capital investment.

Cost per cow yearly is estimated at $75. This is based on a consignment of 320 cows which will provide an average of 250 milkers per day. For a 20-cow herd, this would cost the dairyman about $125 per month. Operating costs of the project will be taken care of by the fee.

Q. Are feed and bedding included in this figure?

A. No. Each dairyman is responsible to produce his feed and bedding and transport it to the central barn. Manure from his herd is hauled back to his farm.

Q. How are plans working in various states?

A. Organization is slightly different in both Utah and Iowa, but basic ideas are similar. Twelve dairymen near Monroe, Utah operate a central dairy barn where they milk 200 cows twice a day.

Each member has a corral near the barn and each dairyman feeds his own cows. Milking is done by employees at 25 cents per cow each day. Other co-ops keep cows at home and members drive to the milking parlor twice a day.

The Iowa cow pool is operated by farm owner Carrol Morris and represents an investment of about $100,000. Cows are kept in a large drylot with a loose housing arrangement. Provision is made for 800 producing cows.

Herd owners pay a yearly fee of $30 per cow and sign a 3-year contract. All costs including feed, labor, roughages and veterinary fees are deducted from a monthly milk check. Remainder goes to the dairy farmer.

A man had just finished placing flowers on a grave in a public cemetery when he noticed a most solemn Chinese placing a bowl of rice on a grave.

"What time," whispered the man, *"would you be expecting your departed one to come up and eat that rice?"*

"About the same time yours comes up to smell the flowers," was the reply. —*Lois Karl*

They Crashed the 200-Bushel Corn Barrier

How three 200-bushel producers get the most corn per acre . . .

Condensed from Capper's Farmer

Ralph Peebler and *Norman Reeder*

FOUR times in 7 years Herb Roadruck has been high man in the Indiana 5-acre corn contest. His yields average out to over 200 bushels to the acre. Last year he capped his winnings with a whopping 218-bushel yield.

Out in Dawson county, Nebraska, Max Loibl made yields the last 2 years that averaged just shy of the 200-bushel mark. In 1956 he hit 208 bushels on 22 acres. Last year his 35-acre field tallied out at 190 bushels to the acre.

Lawrence Gunnelson, Jefferson county, Wisconsin, consistently places high in Pacemaker competition. He has shattered the Wisconsin yield record with 219 bushels. The field which chalked up this top yield was in corn for no less than five straight seasons.

When you talk with these three men you soon learn they have a lot of corn-growing savvy. They don't miss a detail in nurturing a corn crop from planting straight through to harvest.

Roadruck farms around 300 acres of level Brookston silt loam in White and Tippecanoe counties. He raises about 165 acres of corn, 50 acres of certified soybeans, 70 acres of certified small grains.

The piece that topped Indiana growers at 218 bushels was in the same field that produced two previous winning yields, both close to the 200-bushel mark. The field had grown corn the previous year. And it had produced either corn or soybeans in each of the past 5 years.

Roadruck no longer uses sod or cover crops. He has no manure. He is making his records with continuous grain crops, plowing down heavy crop residues

Reprinted by permission from Capper's Farmer, Topeka, Kansas

to build organic matter.

Here's what he did to grow 218 bushels of corn in 1957: He shred the stalks of his 1956 corn crop shortly after it was picked. To keep the heavy mat of broken stalks from drifting like snow, he promptly disked it in, mixing it with soil.

Disked in with the shredded stalks were 200 pounds to the acre of 45-per cent urea nitrogen, plus 300 pounds of 0-47-0 triple superphosphate, and 400 pounds of muriate of potash. These high-analysis basics—which manufacturers use to make mixed fertilizers—were broadcast.

Roadruck fall plowed 7 to 8 inches deep. The following spring, 2 to 3 weeks before planting, he disked in heptachlor to control soil insects. He planted early in May in a fine, moist seedbed, using a bushel of large round seed to every 2.5 acres. This rate of planting insured a stand of 20,000 stalks to the acre.

Roadruck made his 1957 record with a relatively new "KV" hybrid which he is growing for Chester Hybrids of Indiana. In field studies it is showing evidence of exceptional ability to handle heavy amounts of fertilizer.

Down 2 inches to the side and below the seed he put 200 pounds to the acre of 11-48-0 containing water-soluble phosphorus. Roadruck uses a modern 4-row planter which places fertilizer alongside the row, not in with the seed.

This placement sidesteps the danger of fertilizer burn in dry soil; puts the band of fertilizer where seedling corn plants can get the heavy phosphorus feeding needed to shoot off to a fast start.

At planting time, he sprayed Randox over the row to knock out weeds as they sprouted. The planting tractor carried two 50-gallon drums with hoses leading back over the planter to T-jet nozzles behind each packer wheel.

Money is like an arm or a leg—use it or you lose it.—Henry Ford

Rate of application was 1-1/3 quarts of Randox to the acre. A PTO pump furnished pressure for spraying.

The 1957 record crop was cultivated twice. Just before the first cultivation Roadruck side-dressed with 188 pounds of actual nitrogen per acre in the form of anhydrous ammonia. This was knifed into the soil between rows.

Finally, Roadruck made sure that corn borers didn't shorten his yield. He watched for egg masses and shot-hole feeding, then hit borers twice with granular DDT. Corn was 4 to 5 feet tall at second application.

Add up the units of fertilizer

Roadruck used in 1957: Actual nitrogen — 300 pounds; actual phosphorus — 240 pounds; actual potash — 240 pounds.

This is more than enough fertilizer for 218 bushels of corn. But Roadruck's goal is to keep pushing yields up and still farther up. To do it, he banks fertility in the soil. He builds organic matter with annual plow-down of 6 tons of corn stover to the acre.

He continually probes his soils for evidence that they are alive with soil organisms, charged with air and water. Only in soils filled with active organic matter, he says, can you get the full-powered transfer of fertilizer nutrients needed to make corn yields better than 200 bushels.

The average dairy cow will drink 12 to 15 gallons of water a day. But a high producer may need as much as 40 gallons.

High fertility and high tilth are the two big factors in hitting high corn yields, Lawrence Gunnelson will tell you. He uses over 400 pounds of nitrogen, 300 pounds of phosphorus, and 100 pounds of potash per acre per year.

This is well above the fertility level his corn ground needs. But he says this gives corn plenty of available nutrients at peak uptake periods. And the more fertile his soil, the more trash he has on hand to put back in. This builds structure, increases moisture absorption to carry the crop through dry weather.

Gunnelson swears by 115-day hybrids—later-maturing varieties than most grown in his area. May 1 is his planting date. Both early planting and long-season hybrids take advantage of the full growing year, he says.

He made his 219-bushel yield with Funk's G-440 and hit 201 with Wisconsin hybrid 641-AA. Pioneer 247 has been a high yielder for him, too.

His new planter places starters below and to the side of the seed; gives him the plant population he wants.

At 5 miles per hour, it clicks off 3 kernels to the hill, 20 inches apart, in 42-inch rows. This is equal to a corn plant every 6½ inches of row and a population of around 20,000.

Max Loibl, who raises 400 acres of corn in Nebraska irrigation country, shoots for a stand of about 22,000. His high yield of 208 bushels was made with a DeKalb 3X hybrid.

Like the others, Loibl tries to eliminate anything that gets in the way of top yields, even moisture. In the fall he chops up a 6-inch blanket of stalks, sops it up with liquid nitrogen before it's disked in. Complete fertilizer is

plowed down.

He relies on good equipment to get corn in early—and fast. Endrin is disked in to whip corn rootworms. Dieldrin and endrin are used on borers and 'hoppers.

He stops weeds in their tracks with three rotary hoeings, two cultivations. More nitrogen — 150 pounds — goes on as an early side-dressing.

In his tests he has found hill-dropped corn will net at least 25 extra bushels per acre. He says this spacing apparently lets in more sunlight to the lower corn leaves. And it aids movement of carbon dioxide.

Loibl is a veteran irrigator. He uses a soil probe—and experience—to keep his soils at 50- to 80-per cent water-holding capacity during the growing season. He has four wells which are used as stand-by insurance when ditch irrigation water runs short.

Loibl is moving to earlier picking and crop drying to pick up the dozen or more bushels you lose from late harvest.

Loibl, Roadruck, and Gunnelson aren't ones to rest on their laurels. Each crop gets a treatment based on the most advanced insights they can get from college and industry research, plus their own restless inquiry into conditions in their fields.

From their contest plantings, they learn how to get higher returns from all the corn they grow. And from the looks of this year's crop, all three stand an excellent chance of keeping their membership in the elusive "200-bushel club."

Management becomes important in growing these high yields. The hybrids and know-how are available to go well beyond current 125- to 150-bushel yields. The trick is to piece all crop management knowledge together into a neat package.

Disposal Pit A Must for Poultry Farms

Quick disposal of dead birds on poultry farms is important as a means of limiting the spread of disease.

A deep, covered disposal pit simplifies this problem. A pit will soon pay for itself in time saved and reduced health hazards.

The Texas Agricultural Extension Service has released a leaflet outlining the construction of a pit. It is entitled "Poultry Disposal Pits," contains detailed information on location, dimensions and materials as well as a diagrammatical sketch. It is available from the Agricultural Information Office, College Station, Texas. Ask for L-401. —*Texas A & M*

No. 1 Soybean Threat

The soybean cyst nematode can wipe out a crop. Once you see it at work, you won't forget it . . .

Condensed from Crops & Soils

Howard G. Small, Jr.

THE soybean cyst nematode presents a new challenge to farmers and agriculture scientists.

To the farmer, it is just another nematode to contend with, but to the scientist it is a cause of grave concern.

The soybean cyst nematode alone could wipe out a field of soybeans, and along with other nematodes could do more damage in the South than all other pests and diseases combined.

This nematode *(Heterodera glycine)* was first discovered in 1954 in the area around Wilmington, N. C. It has since been found in Tennessee, Kentucky, Missouri, Mississippi, and Arkansas. It is believed to have been brought in on shipments of bulbs and contaminated soil. The pest had been recorded previously only from Japan, Korea, and Manchuria where it was named "Yellow Dwarf" because of the effects of its damage to plants.

The soybean cyst nematode attacks the roots of soybeans and several other crops including lespedeza, common vetch, snap beans, and some weeds. Since soybeans are a major farm crop, we must recognize the threat that this nematode poses to the soybean industry.

Farmers could lose more money from the soybean cyst nematode than from all the diseases of soybeans combined.

The nematode is spread by machinery, containers, heavy rain, root crops, and transfer of contaminated soil containing the cysts of the nematodes.

Symptoms

The injury caused by the soybean cyst nematode is easily recognized. Soybean plants are stunted, the foliage becomes yellow prematurely, and the yields are low. A severe infestation may destroy the entire crop. A heavily infested 4-acre field near Wilmington yielded less than 4 bushels of soybeans. The infested areas may range from small spots to an entire field. Once established in a field, the soybean cyst nematode can reproduce to a tre-

Reprinted by permission from Crops & Soils, 2702 Monroe Street, Madison 5, Wisconsin

mendous population in a favorable season.

You can detect the soybean cyst nematode on roots by close observation with the naked eye. It is best to use a microscope for positive identification.

Roots of infected plants have numerous small lemon-shaped female nematodes with cysts attached to them. These cysts are about the size of the head on a straight pin.

The lemon-shaped females range in color from white to yellow to brown, depending on their age. The young females are white and the older or mature females are yellow to brown. The brown nematodes are dead females which have been transformed into tough, durable cysts. These cysts are filled with eggs which hatch when conditions become favorable. They provide the nematode a safe and sure way of over-wintering.

Life History

The life cycle of the soybean cyst nematode is similar to that of the sugar beet nematode in the West coast area. It has three stages—eggs, larvae and adult.

The nematode over-winter in the soil enclosed in the brown cysts formed from the cuticle of the female body. In spring, the hatching of larvae from the eggs marks the second, or infection stage.

Larvae make their way through the soil in search of plant roots on which they can feed and reproduce. They are attracted to and enter the young roots of various legumes. The larvae which fail to reach a root remain alive for a considerable length of time but finally die of starvation.

Those larvae which have entered roots begin to feed and grow very rapidly, passing through several distinct stages of development (the end of which is marked by the shedding of the cuticle). The soybean cyst nematode goes through four such molts from the egg to the mature female. The molts from the egg to the egg-laying female take place in about 24 days.

The mature female is lemon-shaped and measures about 1/32 inch in the longest direction. The male is long and slender and is about 1/16 inch in length.

As the female feeds within the root, her body swells, splits the root surface, and protrudes into the soil. This is the stage in which the male nematode becomes evident. The males leave the root and mate with the females. The males then live in the adjacent soil until they die.

Produce 400 Eggs

The females produce an average of 400 eggs during this life span of several months. About one-half of the eggs are deposited in the so-called "egg sac." The remaining eggs are retained in

the female's body.

Eggs deposited in the "egg sac" hatch within a few days and the larvae move through the soil in search of new roots on which to feed. The eggs retained within the body of the female are enclosed when her body is transformed into a cyst which is highly resistant to decay. This cyst protects the eggs until they hatch and develop into infection larvae.

The cysts remain dormant in the soil during the winter. Thus at the end of the growing season, the soil will contain cysts with second stage larvae.

The development from the egg to the egg-laying female usually takes a minimum of 24 days.

During feeding the soybean cyst nematode apparently produces digestive enzymes which are injected into the plants and may be the cause of stunting and death. This has not been positively proven, but there is some evidence to support it.

Only the environment can control the degree of infestation. The amount of infestation in a field is determined by the ability of the nematode to reproduce and reinfect roots of susceptible crops.

Soybeans that are grown in soil heavily infested with the nematode do not stand a chance. Death is imminent. The soybean cyst nematode robs the root of nutrients and water, and secretes enzymes that act against the plant. Once you have seen the soybean cyst nematode at work on a soybean field, you will not readily forget it.

A catch or trap crop may be planted to stimulate the nematode to hatch, but these crops must not be susceptible to the nematode. This practice continued over a period of 3 to 5 years tends to reduce the population of the nematode. If the soil is kept free from susceptible plants, the nematodes will soon die.

There has been some work done using methyl bromide, *Nemagon* and other soil fumigants for controlling this nematode. Both *Nemagon* and methyl bromide gave promising results. The only drawback to using these would be the cost involved as compared to the returns.

Many of the larger stars are 10 to 400 times the size of our sun.

Bulbs and corms that are brought in should be treated with 85% sodium trichlorophenate *(Dowcide B)* used as a soak for 1 hour when used at the rate of 2 pounds per 100 gallons or for 15 minutes when 3 pounds are used.

It is imperative that we control the spread of this new pest of soybeans.

An Eye on the Wire

An Englishman tells how to splice a loop in a wire rope . . .

Condensed from Practical Power Farming

R. K. R. Taylor

WIRE ropes have many uses on the farm for the tougher hauling jobs such as dragging tree stumps or pulling out bogged-down implements, but they are not generally in use every day. For this reason particular attention must be paid to their care and maintenance. Rust will weaken a wire rope far quicker than hard work, and a damaged wire is both difficult and dangerous to handle. If a faulty rope parts under heavy strain the ends may whip back with lightning speed and cause serious injury.

Wire ropes are generally made with six strands, twelve wires to the strand, and have a hemp core. A more flexible, and consequently more expensive rope, is made with six strands of 24 or even 37 wires to a strand. But for general use on the farm the former is quite suitable.

To find the ultimate strength and safe working load of a wire rope it is necessary to make a few calculations. To find the strength in tons, use the formula $2C^2$, in which C represents the circumference measured in inches. The safe working load is about one-sixth of the ultimate strength.

For example, a 3-in. wire rope has a breaking strength of 2 x 3 x 3 = 18 tons, and a safe working load of three tons.

When buying new wire rope make sure there are no kinks in it because they cannot be removed by stretching. Roll it out on a turntable, which can be made easily from an old cart wheel mounted on a spindle. If this is not possible roll the wire along the ground. On no account must the coil be laid on the ground and the end taken over.

Inspect ropes regularly and keep them well greased both when working and stored. When they are run through blocks or around a barrel, make sure that all surfaces are perfectly smooth. Always keep the tractor in a straight line with the load that is being pulled. Chafing on a corner will halve the life of a rope.

Take the full strain slowly. A sudden jerk may be three or four

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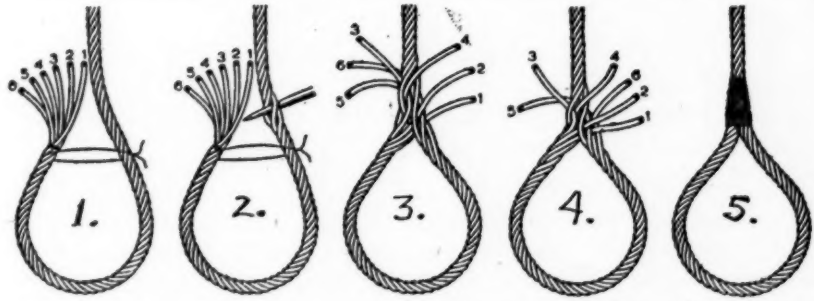
times greater than the full weight of the load itself. Examine the ends of the rope regularly to make sure they are properly secured. If not put a whipping of fine twine on the end of each strand, and a larger whipping around the end of the rope itself.

To splice an eye in the end of the rope, which is far better than attempting to tie knots in it, a long tapered steel marline-spike is needed. Hang the rope in a position so the eye that is to be spliced will be level with the chest. After pushing the spike

Lift Two Strands

Insert the marline-spike, lifting two strands as shown in Fig. 2 and tuck the first towards the right pulling it tight. Insert the spike through the next strand to the left and lift only one strand. The point of the spike should come out at the same place as before. Tuck away strand two as before.

The next tuck is known as the locking tuck. Push the spike in the next strand and, missing number three, tuck away number four from the point of the spike to-



Figs. 1 to 5: The successive stages in making an eye splice in wire rope, starting on the left and finishing with a neat eye bound with wire on the right. Remember the cardinal rule of splicing is "over one, under one."

under a strand, do not draw it out until the tuck is made and all slack has been pulled through.

Unlay the six strands for approximately nine inches, and secure them with a temporary lashing. Bend the wire to the size of the eye required and tie it temporarily in position, taking care that the loose strands are on the left (Fig. 1).

wards the right hand. Without removing the spike, tuck away strand number three behind the spike towards the left hand. Insert the spike in the next strand and tuck away number five behind and over the spike. Do the same with number six. Pull loose strand well down. This completes the first series of tucks, and the

result should appear as shown in Fig. 3.

Starting with strand number one and taking each in rotation, tuck away under one strand and over one strand, until all the strands have been tucked four times.

If it is intended to taper the splice, the strands may be split at this point, half the wires being tucked away as before, with the other half cut off close to the splice.

The best way to finish a splice is to parcel with oily canvas and secure with a whipping of thick twine.

Quick and effective substitutes for splices are the patent wire-grips shown in Fig. 6.

Fig. 6: Wire-rope grips can be used in an emergency for joining or making an eye. They can be purchased to fit ropes of the thicknesses commonly used, but are not as neat as a good splice.

Russians All Wrong

Blood typing research at the University of Wisconsin has thrown cold water on some findings by Russian geneticists.

The Russians have stated that White Leghorn chickens injected with blood of another breed show changed characteristics, and—more important—are able to pass these changed characteristics on to their offspring. Thus, in effect, certain changes produced in an animal becomes genetically part of that animal's cells and can be passed on and on as a permanent feature of that one animal's family.

That's what the Russian geneticists say.

But you get a different view from researchers who conduct blood type inheritance research at the University of Wisconsin. These men have been able to show that cattle can pass on to their offspring only the characteristics which they derived from their parents—not characteristics acquired later in life.

One conclusion to be drawn from this research is that you don't need to worry for genetic reasons about blood you get in a transfusion; there's no danger of passing on the blood donor's characteristics to your children or grandchildren.

—University of Wisconsin

Cotton Without Cultivation?

An Arkansas farmer uses pre-emergence weed killer to get 2 bale yields and cut costs $5.00 an acre . . .

Condensed from Arkansas Farmer

OUR newest cotton production formula may be—plant it and forget it! (Except for the bugs, of course.)

This ideal condition may be nearer than you'd imagine. One Arkansas farmer did just that this season. And, he harvested a two-bale per acre yield on his personal experimental field.

Dick Barnett, operator of Elms Planting Company in Altheimer, Arkansas, harvested that yield on a patch that was not cultivated, chopped or flamed after planting. Yet at harvest time the field was as weed-free as could be.

Barnett and general farm manager, Gene Lyon, used a five-acre field for the successful experiment. Next year it will be tried on a much larger scale.

Key to the program was liberal use of Karmex DL, DuPont's pre-emergence weed control agent for cotton fields. Karmex DL works on the roots of weeds, and keeps them down for a considerable length of time.

Field Planted Twice

The experiment itself was quite simple. Barnett had six pints of Karmex DL per acre applied to the field just before planting. When the first cotton didn't establish a good stand the surface was lightly disced and a second planting went in. This time the cotton stand was excellent but weeds didn't have a chance.

Normally, Karmex DL is used in a 12 to 16-inch band over the seed rows. It keeps weeds down for up to eight weeks. A cultivator takes weeds out of the row middles. Used in this fashion, Karmex DL does an excellent job of controlling weeds.

Barnett has been using such a system. In fact, most of his cotton was planted that way this year. A 14-inch band of Karmex DL is used, followed by up to three applications of herbicidal oil as a post-emergence spray. This is followed by a hand chopping, then by two or three flame cultivations.

Reprinted by permission from Arkansas Farmer, Box 246, Little Rock, Arkansas

Fields in which this treatment was used were clean as a whistle, too, but the cost per acre was higher.

The 14-inch band uses about one-half pint of Karmex DL per acre, compared to the six pints per acre broadcast on the experimental field.

Taking a look at the experimental field's history, Barnett said it had been in cotton four years. It was prepared in much the same way that all of his cotton land (about 3500 acres) is prepared. He uses flat beds and a fairly heavy rate of fertilizer. The experimental field got 90 pounds of actual nitrogen, 75 pounds of actual potash and 65 pounds of actual phosphate, all applied as straight material (anhydrous ammonia, muriate of potash and triple superphosphate.) The Karmex, mixed with water, was applied with a high sprayer.

The first experimental planting in early May produced a spotty stand. That's when a narrow-spaced disc harrow went over the entire field. The second planting was made in late May.

"Weeds and vegetation came up with the cotton," Lyon said, "but one by one the weeds keeled over and the cotton showed up strong. A fine stand developed in short order."

Taking a close look at the cost picture, Barnett gave these comparisons:

Experimental Field —

Cost of materials plus application totaled $14.12 per acre.

Regular Program —

Tractor work, herbicidal oils, flaming and some hand chopping averaged $19.08 per acre on about 3500 acres.

"The cost difference might not sound so great," Lyon said, "until you think of the other advantages. Our labor and machines would be for other jobs. As farm manager, I would be able to supervise soybean planting and other operations instead of cultivation

An ultrasonic wave machine is being used by an English firm to measure the thickness of fat on the back of live hogs.

—which usually takes quite a bit of time. It means we could get our other crops in faster.

Barnett said the new program also would eliminate weather worries at cultivation time. Often, he said, machines are used in wet fields and compaction of soil results.

Some Questions

Some questions still remain. Among them, Barnett mentioned these:

"Over a four or five year period, will the overall effect be better each year?

"Will there be any toxicity or carryover which might have some

effect on future crops?

"What effect did the discing have? (Next year he'll broadcast Karmex DL and disc it in lightly before planting cotton.)

"What effect did the weather have? We do know that Karmex DL needs moisture to do the best job, so we wonder how it would work in a dry season.

"Will it work in all soils? Our test plot contained light sandy loam and we don't know what the effect will be on fields of heavier soil."

It's a safe bet that some of these questions will be answered by this time next year—perhaps sooner.

Dairy Cow Not Influenced by Lights at Night

Milk production can be increased in a number of ways, but artificial lighting is not one of them. Unlike their country cousins in the poultry house, dairy cows aren't fooled by the practice of extending daylight with electric lights, according to scientists at the Colorado State University Experiment Station.

Two six-week tests were conducted last winter to see what effects, if any, artificial lighting has on milk production or feed consumption. Lights were turned on at 6 p.m. and off at midnight, on again at 4 a.m. and off at 7 a.m.

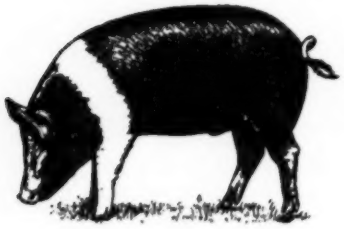
Comparison of two lots of 17 Holsteins showed no difference in either milk production or feed consumption. Both groups received the same amount of silage and consumed it in the same length of time.

Actually, the only apparent influence the lights had on the cows was to cause them to wake up earlier in the morning and line up before the door of the milking parlor.

—*Colorado Experiment Station*

Poultry specialists say that 300 hens can be expected to lay an average of 5,100 more eggs per year if watered by an automatic waterer than by hand. At this rate, an automatic waterer, or even a water system, can be paid for in a very short time with increased production.

Breeders Must Test Their Boars



Quickest way to profitable pigs is one progeny-tested boar after another, points out this English expert.

Condensed from Pig Farming

Dr. John Hammond

MOST dairy farmers have now seen the effects on milk production of the progeny testing of dairy bulls. The list of progeny-tested bulls published each year forms a good guide as to where to go for a bull which is likely to breed well for high milk yields. Few pig farmers, however, have yet realized that the time has now arrived when we shall be able to do the same thing for progeny-tested boars to produce bacon pigs which will grow fast, give a good return for the food fed and grade well.

The boar is half the herd, for all the pigs born will have half of his blood; all the sows together make up the other half. The quickest way to get into good profitable pig stock is to follow one good progeny-tested boar by another, for the second generation will have 75 per cent of good blood from the two good boars used in succession.

What to Look For

The main things for the commercial pig breeder to look for are:—

Speed of growth, that is the number of days the pigs took to reach bacon weight, for the quicker they grow the quicker money is turned over.

Feed conversion ratio, that is how many lbs. of feed it took to produce 1 lb. of pig, for the cost of feedingstuffs forms about 80 per cent of the cost of bacon pig production.

Thinness of the backfat and length of the side.

The two latter points will improve the grading results and so give increased returns.

In addition to these points, pedigree breeders will also need to consider other things, such as marks for shoulders and hams—characters which at present are not considered in the grading returns. The way the pedigree breeder can use the tests is by finding out what is the chief defect in his herd. If, say, it is

Reprinted by permission from Pig Farming, Lloyds Chambers, Ipswich, Suffolk, England

length, he should look through the boar progeny-testing results, pick out a boar which is particularly good in this character (and not too bad in the others) and introduce this boar's blood into the herd.

During the first few years it is doubtful if the commercial producer will be able to buy good progeny-tested boars, for they will probably all be required by the pedigree boar breeder to build up the reputation of his herd for producing good breeding stock. The commercial pig farmer, however, should be able to buy sons of these proven boars out of the same sows from which pigs were sent in for testing, in the same way that sons of proven bulls are now being used in the dairy industry.

Although progeny testing is being set up primarily for the pedigree breeder, the commercial breeder will benefit if he goes for his next boar to the pedigree breeder who, through use of good progeny-tested boars, has shown that he is breeding a type of pig which has good commercial qualities.

It is to be hoped that before long a limited number of accredited herds of pedigree pigs will be designated, similar to the breeding centers in Denmark. These breeding centers in Denmark use good proven boars in succession in the herd and supply practically all the boars used there. Such herds need not necessarily be large ones, provided the pigs have good commercial qualities. One of them has only ten sows yet the breeder is selling about 60 boars per year for, having used nothing but proven boars through several generations, his stock is breeding true for commercial characters.

There is no reason why the small pedigree breeder, provided he has good stock, should not profit just as much from testing his boars as the large breeder. If his boars do well in the test, he should find a good and increasing sale for young boars from the parents of the test pigs and, when the time comes, be accepted as an accredited herd. This system of accredited herds is now coming into operation in Northern Ireland.

Indians in the Tierra del Fuego area of South America, for centuries, survived without clothes and with very little shelter in a cold climate. Darwin writes of seeing them lying naked, on the frozen ground in snow and sleet.

At present progeny testing in England is organized for bacon pigs only, and the question has

been raised as to whether we should not progeny-test for pork and manufacturing pigs as well.

Testing Porkers

The question arises as to whether the pork industry is not better served by the present system of progeny testing for bacon so that the first-cross pigs will grow quicker and have better hams, rather than progeny testing the pure colored breeds for pork directly. Pig recording, with measurement of the mothering qualities of the sows, is the more important for these colored breeds.

If there were sufficient demand from breeders of the white and colored breeds to test them for pork, this could easily be done at the present progeny testing stations, for it would only mean slaughtering at 130 lbs., at which weight the rations are changed. Nor would carcass appraisal present any difficulties. The difficulty in grading pork is that the carcass cannot be cut, but this could be done in progeny testing.

Progeny testing for the manufacturing pig of 250 lbs. liveweight, however, presents difficulties in that at present there is no agreed specification of the carcass quality points that are required. The Dutch, who are at present progeny testing one breed for this purpose, have quite a different system for evaluating the carcass from that used for the bacon pig. This could be used here if it were acceptable to our manufacturers. With present accommodation, however, fewer boars could be tested for manufacturing purposes as the time taken to reach the necessary weight would be longer.

Another aspect of this question also needs consideration. Would the progeny-tested pigs which came out best for bacon at 200 lbs. liveweight be the best for the manufacturing trade at 250 lbs. liveweight? If they were, then the present progeny tests would serve both purposes. If not, then we should have to produce a new breed for this purpose, or import the Dutch one, for it would lead to a bad mix-up to have two different types within one breed.

A report issued by the U. S. Department of Agriculture spotlights the importance of the American farmer as an industrial customer. Agriculture buys more petroleum than any other group. Farmers take 6,500,000 tons of steel and enough raw rubber to put tires on nearly 6,000,000 cars a year. Agriculture uses more electric power in a year than Chicago, Detroit, Houston, Baltimore and Boston combined.

Sheep Records Speak Louder Than Looks

Performance testing comes to the sheep industry, to bring better sheep and more profits . . .

Condensed from National Livestock Producer

Stewart H. Fowler,
Louisiana State University

MEN have been shepherds ever since Adam and Eve. Very little is known of the ancient methods of sheep selection, but no one would deny that considerable progress has been made in adapting animals to serve our needs for wool and lamb.

The most common method of selecting breeding sheep is visual appraisal, based upon methods used in the show ring. This method has brought considerable modification in conformation and type, but much less improvement has occurred in such performance factors as rate and economy of gain and carcass and fleece merit.

Method is Not Perfect

Selecting animals by "eye" is only a guess at what they will produce, because the outward appearance of an animal and its genetic make-up are often quite different. Actually, live stock should be selected on their ability to perform, because the best estimate of the genetic make-up of an individual is its own performance. Even this method is not perfect, because most of the economically important traits are conditioned by many genes, and the individual genes can't be identified.

The adoption of performance testing, however, can bring the sheep producer better sheep and more money. This selection procedure has received wide application in the beef and swine industries. A performance testing program offers equal opportunities of advancing progress in the sheep industry, and increasing numbers of sheepmen are turning their efforts toward improvement in that direction.

There isn't anything mysterious about performance testing. In brief, it is merely the keeping of accurate, systematic, and fairly complete records on traits of high economic importance to the financial success of the sheep enterprise and then using such records in the selection of flock replacements.

The starting point in keeping the necessary records is to identify

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each sheep. Ear tattoos or ear tags may be used for this purpose, and they should be put in the ear shortly after birth.

The information to record on each lamb should be kept to a minimum which will still give a fairly accurate picture of the lamb. Different factors may be used by individual breeders in scoring lambs. Breeders will stress the traits that they consider most important in their particular flocks.

The traits with the greatest economic importance should be emphasized. As the production of market lambs and wool is the ultimate end of all phases of sheep production, the most important characters of sheep are pounds of meat, pounds of wool, and inches of staple length.

Most commercial sheep producers market their lambs at weaning. Consequently, in most cases, weaning performance is the most important thing to measure. The more essential factors to consider are: Weaning weight, conformation, staple length, and density and uniformity of fleece. Weaning weight and staple length would be obtained from actual measurements, but visual scores would be used in evaluating the other characters.

Other Factors Are Important

Under some circumstances, additional factors may be of such importance as to warrant inclusion in the performance testing program. These include such traits as: birth weight of lambs, yearling type of conformation, face covering (open face vs. wool blind), number of skin wrinkles, fleece weight, and wool grade.

The amount of attention to give to any particular character will also depend upon the heritability of the character. More rapid improvement can be made in highly hereditary traits. Many of the profit-making traits in sheep, such as prolificacy and weaning weight, are strongly influenced by environment, and improvements resulting from favorable environment can't be passed on to the next generation. If most of the improvement is due to environment, the heritability of that trait is low and little progress can be made through selection. In general, fleece traits are more highly heritable than are lamb-production characteristics.

The tune of 'Star Spangled Banner' was used in London for years before Francis Scott Key put his words to it in 1814.

The producer may also regulate the attention given to a particular trait by considering the level of perfection already attained for that trait. If, for example, selection for heavier wean-

ing weights has been highly successful but the lambs are somewhat faulty in conformation, less emphasis might be given to weaning weight and more pressure exerted toward acceptable conformation.

Selection can be confused by differences due to non-hereditary factors. These include such

All poultry and poultry products moving across state lines for sale after Jan. 1, 1959 must be inspected by an agent of the U. S. Department of Agriculture.

things as differences caused by feed and care, age of dam, type of birth (single or twin), and age of lamb at time selection is made. Single-born lambs weigh more at weaning than lambs born and raised as twins. Lambs out of mature ewes tend to weigh more at weaning than those out of two-year-old dams.

Adjust All Lamb Weights

If such differences are disregarded, older and single lambs and lambs from mature ewes are favored because they are heavier. However, they are no better genetically than younger and twin lambs from two-year-old dams. Thus, to compare all lambs in the same flock, certain corrections or adjustments are necessary. For example, all lamb weights might be corrected to a standard age (perhaps 140 days) and adjusted to a single, male equivalent from mature dams.

That is, weights are adjusted to a common age, and additional weight is added for twins, for ewe lambs, and for lambs from two-year-old dams. Some standard adjustment factors have been established by various agricultural experiment stations for general use. These factors will vary with management and other environmental factors, but they are accurate enough to permit fair comparisons until more precise estimates are developed for specific flocks.

If a producer wishes to purchase stud rams and replacement ewes from several different flocks, it is impossible to compare scores of one flock with another. The differences between flocks would invalidate any such comparison. For the same reason, performance testing on the farm or ranch will not serve as a measuring stick to compare the programs and progress of various breeders.

In order to reduce such environmental influences, some states now have created central testing stations. Facilities are provided where the animals of a number of different breeders may be brought together and treated in a similar manner. Such facilities, however, are quite limited at present, so most performance

testing will, of necessity, have to be conducted on individual farms and ranches. Such a plan will give an accurate measurement of performance within a given flock where the lambs are exposed to the same management and have access to the same quantity and quality of feed.

The producer should also realize that comparison of improvement from year to year is difficult and inaccurate. Seasonal differences make a big variation in weaning weights. In good years, lambs average heavier in weight at weaning, whereas weaning weights are considerably lighter in years of scarce feed supply. Where records for a number of years are available, however, a definite trend toward heavier weaning weights and greater overall net merit is usually evident.

In general, rather rapid progress will be made during the first few years, and this will be followed by slow but fairly continuous progress in later years. The trend is largely the result of the identification and use of superior and more productive sires early in the program.

Rate of Progress Varies

The rate of progress in improving the flock is dependent upon a number of factors. Among the most important are: (1) heritability of the characters selected; (2) genetic and environmental correlations between the traits; (3) number of characters selected for simultaneously; (4) the amount of heritable variation present; (5) accuracy of the breeder in determining which animals to select; (6) the number of animals that can be culled and still maintain the desired size of the flocks or bands; (7) the flexibility of the mating system.

The effect of heritability of a character upon selection was discussed above. In general, a larger part of the progress that is reached for in the selecting program will actually show up in the next generation if heritability is high.

Farmers, clergymen, teachers, lawyers, and engineers have the longest life expectancy.

Where two desired characters are positively correlated, selection is aided. Selection for one of the characters is accompanied by some automatic selection for the other. For example, selection for rate of gain is accompanied by much automatic selection for economy of gain, as defined by "feed per 100 pounds of gain," because rate of gain and efficiency of feed utilization are both highly heritable and are strongly associated or correlated with one another.

By the same token, a negative

correlation between two desired traits or a positive correlation between a desired train and an undesired trait will hamper selection progress. For example, crimps per inch and yield of clean fleece are negatively correlated in the Australian Merino; as selection pressure is aimed at improving fleece grade, or crimps per inch, progress in selecting for an increased yield of clean fleece is restricted.

Since "shipping fever" is infectious, newly arrived feeder stock should be quarantined for a time so animals in the home herd will not be exposed to the disease.

Progress Will Be Greater

The greater the number of characters selected for simultaneously, the slower the progress in improving each. Total progress, however, will be greater if, at the same time, attention is paid to several of the most important traits. The real danger lies in the inclusion of unimportant traits.

Maximum progress is dependent upon accurate records and consistent selection toward an "ideal." If the breeder's ideal changes from time to time, progress will be in one direction for awhile and then must shift in another direction. In the end, little or no progress will be made.

If too few animals are born and raised to permit culling the most undesirable ones, progress is impossible. The more animals that are available from which to select, the more rapid will be the progress made. If a sheep producer is trying to increase the number of animals he owns by saving more of them, he can make less selection than if he is keeping his flock or band the same size or reducing the numbers.

The mating system should remain rather flexible. Too rigid adherence to a particular mating system may restrict the execution of some very desirable matings.

After the sheep producer has decided which economically important traits to consider in his program, it will be necessay to decide which selection practice to follow. Three general methods are available: (1) select for one character at a time until it is improved, and then select for a second, and later for a third, etc., until each has been improved to the desired level; (2) cull simultaneously, but independently, for each of several desired traits; (3) establishing a total score, or selection index, to measure merit.

High palatability is the first requirement of good silage.

The first method is the least efficient, and the last is gener-

ally considered to be the most efficient method of selecting. The first method should be used only if one or, at most, a few characters need improving. In the second method, culling levels are

The 1934 Deusenberg advertised a 320 horsepower motor.

established for each character below which all animals are culled regardless of how superior they are in other characteristics. This, of course, presents the disadvantage that an individual may be culled because it is deficient in one character only when it is really a desirable animal because of being strong in most of the desired traits.

Index Combines All Factors

An index combines all the factors to be considered by adding a total score all the characteristics considered, and all individuals with poor scores are culled. It's the best way to select for several traits at once, as long as it is used with common sense. That is, the total score should be used only as a guide and not followed blindly. More animals than will be needed should be selected on the basis of the selection index; these, in turn, should be closely inspected and further selected for freedom from defects.

Like any other breeding or management practice, performance testing is not a "cure all" for the problems of the sheep industry. However, it can be of considerable help to the sheep producer who is interested in improving the net performance of his flock.

New Cloud Seeding Makes or Stops Rain

Cloud seeding with carbon black may prove a cheap way to control weather. The idea originated with Navy Weather Service Chemist Florence W. van Straten. In one test conducted from a Navy Constellation over the Georgia coast, a pound and a half of carbon black sprinkled on the top of a large cloud dispelled it in 20 minutes. In another test at a lower altitude, carbon black strewn through a layer of moist atmosphere produced clouds in a few minutes. In theory, absorption of the sun's heat by carbon black particles upsets the temperature balance, may cause water droplets to form or evaporate. If and when perfected, the method could be used to start and stop rainfall, break up fog and thunderstorms and control hurricanes and tornadoes.

—*Chemical and Engineering News*

How Yankee Oysters and Japanese Girls Raise Pearls

It's a meticulous business — "only maidens need apply"

Condensed from Wall Street Journal

Igor Oganesoff

TWENTY-FIVE million irritated oysters, trapped in wire cages in warm coastal waters near Toba, Japan, are grudgingly producing pearls, chiefly for the ladies of the United States.

Like most of the pearl buyers, the oyster irritants are also American: Tiny bits of imported Mississippi oyster shell, which are inserted into the Nipponese mollusks. Around these pellets, in three or four years, the oysters form round, lustrous pearls, indistinguishable, say Japanese experts, from the "natural" variety.

Oysters are able to form natural pearls with no help from man —building them up around irritants which accidently enter their shells. The obvious drawbacks of this hit-or-miss production method have spurred the growth of the "cultured" pearl industry, centered largely here in Japan.

Most Are Exported

This year's Nipponese crop of cultured pearls is expected to have a wholesale value of $18 million, up 10% from last year and nearly four times the prewar high. Almost the entire output is exported, with about 65% going to the U.S. Japan last year accounted for 99% of U.S. cultured pearl imports.

The pearl industry is one in which the Japanese take pride. "We're exporting not just pearls but the happiness and beauty of our country," murmurs youthful Yoshitaka Mikimoto, president of K. Mikimoto & Co., Ltd. Mikimoto is the biggest single producer and accounts for one-fifth of Japan's output.

At Mikimoto's retail store in Tokyo, display counters shimmer with necklaces selling for up to $5,000. But these are only standard models; a single pearl, if it's large and perfect, can retail for $3,500 and from there on it's a matter of multiplication.

Only the Frosting

But such high priced trade, company officials readily admit, is only the frosting on their business. About $10 will buy a pair of pearl earrings or cuff links and

Reprinted by permission from Wall Street Journal, Chicago 90, Illinois

milady can fasten a $50 necklace around her throat with a warm satisfaction as any queen. Mr. Mikimoto notes that while "only rich and high class people" bought pearls before the war, now the market has widened considerably.

On Mikimoto's pearl farm in central Japan, one may view the delicate surgical operation that produces pearls. In a long wooden building, 100 experienced girls sit before three-year-old oysters gripped in metal vises, shells propped open with wooden wedges. With special surgical instruments, one large or several smaller pellets of ground Mississippi oyster shells are inserted into the viscera together with a segment of living tissue from a sacrificed oyster which grafts onto the host. The oyster then is returned to its cage and then, over a period of three or more years, coats the pellet with nacre, the substance of pearls.

Average per capita net income of farm people (from all sources) is expected to pass the $1,000 mark this year for the first time. Estimates are that per capita income will be about $1,025, compared to $967 last year.

Though insertion of the pellet takes only a few moments, speed is secondary to precision. "A slip here can kill the oyster or at the very least result in no pearl being formed," explains Nobuya Nagai, roundfaced chief of the firm's general affairs section. Some authorities assert that only Japanese oysters soaking in warm Japanese waters which abound in rich plankton (the microscopic food of oysters) can survive the operation. And no one can quite explain why, but Mississippi shells make the best nucleus, so 1,000 tons are imported yearly by the Japanese industry.

Miwa's Restrictions

So critical is the process of inserting these pellets that only three years ago aged Toyoteru Miwa, former director of the Japan Pearl Export and Processing Association and a long-time pearl man, wrote, in all seriousness:

"It is believed absolutely essential that persons performing the operation should be maidens from the country not yet stained with the evils of society. Good pearls are born only when the nucleus is inserted by maidens leading straightforward, early-to-bed and early-to-rise sort of lives. By contrast, the results are usually poor when the girls have been to village fiestas, the movies or shopping before they get down to work."

Shy Sumie Tani, 22 years old, whose downcast eyes guide skilled

fingers all week, does admit to some shopping and an occasional movie. But this hasn't stopped her from becoming one of Mikimoto's best oyster surgeons. Miss Tani (or Tani-san as she's generally called) has been on the job for five years and she maintains it takes three years' training to do the job perfectly. A rice farmer's daughter, she earns 10,000 yen monthly (about $28), considered a generous wage for a young girl in Japan. In winter, when oyster operations are suspended, slightly built Tani-san sorts pearls for necklaces (also a highly skilled task) which she likes better because "it's such pretty work."

From her work bench, Tani-san can gaze out over the many stationary rafts of bamboo, lashed to metal floats, from which the oyster cages are hung. During the three years or more needed to form good pearls, 30% of the oysters die. Harvesting is always done in October or November when the first hints of winter chill give the pearls a nice finishing luster. Of every crop, about 20% are faulty pearls and are thrown away.

The total tonnage of fertilizer sold during the spring of 1958 was about 15 per cent higher than in 1957. The tonnage of mixed goods increased about eight per cent, while the tonnage of materials was up more then 21 per cent.

A Beginning in 1893

It was back in 1893 that Kokichi Mikimoto, the grandfather of the company's president, first succeeded in producing a cultured pearl. This was only a "blister" pearl, a lopsided specimen formed with one side attached to the shell. By 1904, Mikimoto had 1 million oysters in beds producing pearls—and causing quite a stir in the jewelry markets.

That year the New York Herald reported that "beautiful and perfect pearls are being grown in the oyster beds of Japan as surely as cabbages and potatoes on the farms of America." The paper went on to say that "consternation, disquietude, fear and all the other melancholy sensations of the mind have shaken some of the big precious stone dealers of the country since they heard of this last great feat of the bivalve."

"Land" is the title of the 1958 Yearbook of Agriculture, published annually by the U. S. Department of Agriculture. It is a Congressional document, and each U. S. Senator and Representative has a limited number of copies for distribution.

But the chances of every housewife or fisherman taking up this new art were very small, it explained, because the process is "extremely difficult" and "never will be popular with the masses."

Currently, boosting quality is the most important aim, say Japanese pearl men. "We want to eliminate all the inferior pearls in the world and replace them with good ones," declares Mr. Mikimoto. To accomplish this, he has led other companies to publicly destroy poorer specimens. Last fall two tons of bad pearls (but still valued at $70,000) were burned in a public ceremony with Buddhist priests on hand praying for the "souls" of the pearls. Another $40,000 worth were dumped back into the sea. In this way, the pearl industry hopes to avoid such reverses as last year's 35% slump in pearl quotations within eight months, caused by large export shipments of lower-quality pearls.

Farmer Receives Small Slice of Bread Profit

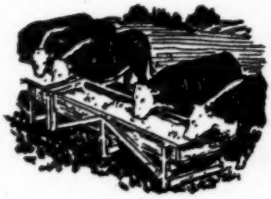
A revised study by the Agricultural Marketing Service reports the average retail price of a one-pound loaf of white pan bread rose from 13.9c in 1948 to 18.8c in 1957, a gain of 35 per cent.

The study presents the following table showing the make-up of the consumer bread price for 1948 and 1957:

	1948	1957
Farmer	3.4c	3.2c
Handling Other Processors	1.2c	1.4c
Miller	0.6c	0.6c
Baker-Wholesaler	6.3c	10.5c
Retailer	2.4c	3.1c
Retail Price	13.9c	18.8c

Most margin factors in the loaf of bread advanced during the past ten years. The major exception was the farm value of all ingredients, which declined from 3.4c in 1948 to 3.2c in 1957. The miller's margin held unchanged. At the same time, the baker-wholesale margin increased from 6.3c in 1948 to 10.5c in 1957 accounting for 86 per cent of the retail price advance in that period. In 1957, the baker-wholesale margin accounted for 56 per cent of the average retail price. —*New Mexico News*

Half a Ton More Beef Per Cow



This cattleman weighed his calves every month to measure his management program . . .

Condensed from Successful Farming

Art Edwards

"MY big goal is to produce an entire calf crop which will average 500 pounds at 180 days of age," says Morris DeWitt, Newburg, Missouri, beef cattleman.

Last year, even though a wet spring season kept his cow herd off their usual spring pastures, his steer calves averaged 465 pounds and his heifers hit 445 pounds at 180 days of age.

This is no small accomplishment considering his 1951 calf crop averaged about 130 pounds lighter at the 180-day age—the age when he makes his important comparison checks.

This was the first year since beginning his testing program that he didn't get an 8 to 10 per cent increase in weaning calf weights. However, he gets a 2-pound daily gain during the seventh month which puts all well over 500 pounds. In fact, 525-pound weights at 180 days were common from his cows in the optimum 5- to 8-year age group.

DeWitt paid little attention to conformation in his earlier operation. Heifers were kept for the herd on the basis of their ability to gain weight faster than their sisters. Consideration was given to the performance record of their dam.

For the past three years he has had his calves graded at about 7 months of age by unbiased experts. Seldom has a fast-gaining calf been judged other than Choice. However, quite a number of the slower gainers also were graded Choice. More than 80% of his calves merit a Choice grade, but he considers only the top 50% to be fast gaining.

DeWitt's management program is simple but thorough. When dropped, the calves are given the normal three-way vaccination to provide protection against blackleg, malignant edema, and shipping fever.

Also, a number is tattooed in the ear. A light-weight tin tag which lasts about 4 months is at-

Reprinted by permission from Successful Farming, Des Moines, Iowa

tached to expedite early weighing. When the ear is strong enough, this tag is then replaced with a flat metal ear-tag.

All bull calves are castrated with a knife after 1 week of age and all calves are dehorned with a chemical which has given nearly 100-per cent control if done early and carefully.

Disease control started early in the game for DeWitt. He has been through both Bang's and antiplasmosis, but now has a clean herd, a feat for which he credits the state veterinarian. A calfhood vaccination program was started 10 years ago and all heifers are vaccinated for Bang's at 7 months of age.

Twice a year, at Easter and Thanksgiving, his herd is put on a mixture of phenothiazine and salt, other minerals excluded, to control internal parasites.

Fly control is achieved by spraying everything once monthly during the season. This also helps control ticks, lice, and fleas. DeWitt helps avoid the tolerance factor by using a different commercial spray each month.

Shortly after calves are dropped, cows and calves go on small grain pasture consisting mostly of rye and barley, or perhaps wheat. DeWitt tries to have one acre per cow per year for grazing.

He says he can't emphasize the importance of good small-grain pasture too much. One season when he was in short supply, he grazed only the heifers and their calves, assuming they needed it worse than the mature cows.

As a result the heifers' calves made bigger than normal increases in the 180-day weight check, while the calves of the mature cows failed to show any increase. DeWitt says this lack of small grain cost him 50 pounds per calf that year.

Normally, all cows and calves get about 2 months grazing on small grain in the spring, sometimes a little in the fall.

As Quick As That

The county agricultural agent picked up the phone when it rang with a cheery "Hello."

A woman's voice answered: "Say, I have a flock of chickens, and I want to know if I put a rooster in with my hens how long will it be before I can expect fertile eggs."

"Just a minute," said the courteous farm advisor, as he picked up the pamphlet which might have the information.

"Thank you," replied the lady as she hung up.

—Better Farming Methods

The Menace of Mastitis

In England, liner design and fluctuating vacuum are major irritants in machine milking . . .

Condensed from Farmer and Stock-Breeder

C. D. Wilson

IT WAS reasonable to suppose, with the coming of antibiotics, that mastitis would at least be on the decline. Such does not appear to be the case. Not only is clinical mastitis more common today than pre-war—or at least veterinary surgeons are treating many more cases—but the organisms recovered from these cases are much more varied. In addition to clinical mastitis there also exists a low-grade type of mastitis which causes a lessening of the milk yield and a reduction in the solids-not-fat constituents of the milk.

The effect of a low-grade infection in milk yield is hard to assess. If one quarter gives less, then the corresponding quarter will compensate to a large extent, but the long-term effect of subclinical mastitis may still be important since there is a limit to the compensation.

Reasons Obscure

The reasons why mastitis is more common today are still obscure. Some say that it is because we have cleared out the sensitive organisms with antibiotics and have left a clearer field for the more resistant ones. Others say that the extra yield obtained from cows has only been achieved at the expense of lowered resistance in the udders.

Yet another group explains the increase because of the expanded use of milking machines. A further theory is that feeding and, more particularly, excessive protein feeding is responsible. I am going to examine these theories quite briefly.

In the pre-antibiotic age, the most usual cause of mastitis was *Streptococcus agalactiae*. This is an organism found only in the udder; and it is always sensitive to penicillin. Thus, it can be, and has been, eradicated from many infected herds which have remained free ever since.

Unfortunately, as we were pursuing this eradication policy, the emphasis changed and staphylococci became more prominent. It was thought that this was because

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Str. agalactiae had been removed and the staphylococci found it more easy to invade the udder. But this theory has since been disproved in a number of experiments and another reason, to be given later, seems more likely.

Staphylococci, when they were first examined, were found to be almost uniformly sensitive to penicillin. Only 2 per cent of mastitis strains were resistant to penicillin in 1945. By 1954 the figure had risen to 40 per cent and this year 68 per cent of the staphylococci recovered from cases of mastitis have been found to be resistant to penicllin.

There are other antibiotics, however. About 100 new antibiotics are discovered every week, but only a few prove useful enough to find a permanent place in the treatment of disease. Many of these are effective against staphylococci and, while in human medicine the introduction of a new antibiotic is followed, in hours often, by the appearance of a resistant strain, this is not true of bovine staphylococci as yet.

Other Germs

In addition to staphylococci it must be emphasized that many other kinds of germs are now found in mastitis and some of these are extremely resistant to any of the known antibiotics. It will thus be seen that we must prevent mastitis and not wait until it has happened.

It can be shown that mastitis increases with increased yield; but this must be taken as a challenge. We cannot stand still and limit progress because of harmful side-effects. We must overcome these side-effects as best we can.

More Machines

The increased use of milking machines has been shown to be responsible for an increase in mastitis and more particularly in staphylococcal mastitis, but it has proved difficult to determine which factors are more important than others.

There are many makes of milking machines but in essence they are all the same. The cow is milked under vacuum supplied to the teat-sphincter by means of a rubber teat-liner which is held in position by a metal shell. The space between liner and shell is alternated between the milking vacuum and atmospheric pressure by means of a pulsator and the liner collapses and expands at each pulsation.

This is the fundamental design of every milking machine, but there are variations in the height of the vacuum, the design

In the north polar regions, the sun rises once a year—about March 21.

of the teat-liner, and the speed and phase-ratio of the pulsation.

Liner design has been shown to be important, there being more mastitis in wide bore, low tension liners with a hard mouthpiece than in narrow bore, high tension liners with a soft mouthpiece.

Of the three factors it is probable that the hardness of the mouthpiece is the most important, with the tension of the liner coming next. The bore of the liner used should vary according to the average teat size in the herd.

Milking at too high a vacuum has yet to be shown as an important factor in mastitis. Milking with a fluctuating vacuum due to lack of vacuum reserve because of an inefficient pump, leaking taps, and other reasons, has been found to be responsible for very severe cases of mastitis.

Unsuitable pulsation rate has not been shown to be a cause of mastitis, but the introduction of wider phase-ratio milking has been followed by mastitis in a number of farms, due no doubt to lack of appreciation of the quicker speed in which cows are milked and therefore leaving the units too long on the cows.

Effect of Feeding

The effect of feeding on mastitis has still to be fully investigated. There are indications that excessive over-feeding with silage and other high protein content feeds has also been the cause.

To sum up, mastitis has not decreased with the advent of antibiotics, but it does not appear that mastitis organisms will develop resistance to all of them except penicillin. It has increased because we are forcing more of our cows and are making increased use of the milking machine.

American negroes own more cars than are registered in all of Russia, and in all of Africa.

Machine milkers can be trained to milk properly, and once we have learned more about the factors in the machine which are responsible for mastitis we should be able to milk cows just as safely by machine as by hand.

A new method of dehairing hides for tanning has been developed by U. S. Department of Agriculture scientists which promises to speed up the process and reduce the cost involved. This treatment may make it possible for packers to remove hair from hides before shipping to a tannery, thus saving shipping costs and allowing a more accurate grading of hides at the time of sale.

Upside-Down Land

Land leveling that cost $12,000 remakes an 80 acre farm . . .

Condensed from Soil Conservation

G. B. Swier, Soil Conservation Service

LAND leveling is an important and popular conservation practice in the Wapato Soil Conservation District of central Washington. But few farm owners have done such a thorough job of face-lifting in their leveling operation as have Wilfred Hall and Herbert Harmon. They have literally transformed an 80-acre farm from a rocky, hard-to-irrigate piece of ground to a productive farm, with controlled irrigation grades, and in addition have created a wildlife area.

During the summer of 1957, Hall and his partner Harmon bought this farm unit for $20,000. They requested assistance from the Wapato Soil Conservation District to "level" the land—including excavating and burying gravel bars—so as to have a minimum of 18 inches of topsoil over the farm when the job was completed.

SCS technicians did the survey work and established grade stakes. The soil is Naches sandy loam, old alluvium river terrace, with gravel occurring at every depth from the surface to 5 feet. The shallow soil is usually on the higher ridges, and the deep soils are found in the swales and sloughs. To assure 18 inches of topsoil it was necessary to remove soil from the swales and replace it with gravel, then re-cover the gravel-filled areas with topsoil.

On ridges where gravel was within 18 inches of grade, it was necessary to first remove and stockpile the good soil and remove the gravel to 18 inches below grade, then replace it with 18 inches of swale topsoil. This "trading" of soil for gravel changed the original soil to such an extent that 31 acres of poor land were reclassified and improved by several capability classes.

Gorillas often make nests in trees, and prepare a cover of grass or limbs for chilly nights.

The contractor, George Bolton, soon worked out a system to exchange the good soil in the sloughs with gravel on the ridges. He established "haul-roads" to

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carry gravel to the slough and tillable soil to the ridges so that the finished job showed no surface gravel.

Two 50 horsepower crawler tractors, with 5-cubic yard carryall scrapers, and one 50 horsepower tractor, with an 8-cubic yard elevating-type scraper, were used. An estimated 125,000 cubic yards of material was moved, about 40 per cent of which was gravel. About one-half of a mile of permanent road and one-half acre of farmyard were graveled in the process.

The irrigation system was designed for the use of siphon tubes and temporary open-head ditches with plastic dams. The design

Indigestion is failure to adjust a square meal to a round stomach.

called for a finished irrigating grade of .25 per cent and a side slope of .03 per cent, with 660 foot runs on 3 fields, and 800 foot runs on the fourth field.

The "bonus" payment came from changing an unsightly 14 acres of permanent slough into 10 productive farm acres and an attractive 4-acre wildlife area. This area still provides drainage for the lands lying above, but it is now a natural habitat for pheasants, waterfowl, and fish. The old slough channel was straightened and narrowed by 'dozing gravel over the cattails and saving the topsoil for the reclaimed land. An artificial island was built at a wide place in the creek.

A permanent gravel road borders the wildlife area which gives easy access to all farm fields. The road crosses the creek at two places, where culverts are installed to regulate the depth of the water. Hundreds of sumac, elderberry, and cottonwood were removed to improve the site. Two small groves were thinned out and can be used for natural duck blinds.

The total cost for the improvement was $12,000, in round figures. This, plus the original cost makes $32,000 that Hall-Harmon have invested. They do not plan to sell this farm, but believe it should sell for $60,000. In any event, the return on their improvements should pay out 3 to 1, gross crop tonnage should increase by 500 per cent or more, while local tax valuation increased 400 per cent. Hall and Harmon figure that the $12 per acre ACP payment will offset the increase in local taxes for several years.

In the meantime Wilfred Hall and Herbert Harmon have a beautiful productive farm, and the contractor and SCS technicians have one more good reference for farmers and others to view.

The Family Farm In A Changing Agriculture

Farming methods are changing but the family farm is holding its own . . .

Condensed from
Michigan Farm Economics
Dale E. Hathaway

THE number of farms in the United States reached a peak around 1920, and has been declining since that time. This trend was temporarily interrupted by the great depression of the early Thirties, but has continued at an accelerated pace in recent years. In order to evaluate this trend, you need to understand the facts behind it.

In trying to account for all farm production, the U. S. Census lists many units which we would not really regard as farms. Among the farms classified as "commercial" by the Census, many have less than $2500 gross sales, an extremely small business by any American standard.

Commercial Farms — Declining or Increasing?

The number of commercial farms in the United States declined by 11 per cent from 1949 to 1954. The decline was only 8 per cent in the north and west, but 14 per cent in the south.

Farms selling less than $2500 worth of farm products decreased in number 27.5 per cent from 1949 to 1954, with the north and west showing a decline of 24 per cent and the south 29 per cent. On the other hand, the number of commercial farms selling more than $2500 of farm products rose 1 per cent from 1949 to 1954. Such farms increased in number by 9 per cent in the south, while there was a 2 per cent decline among these farms in the north and west.

Thus, although the number of commercial farms declined at the most rapid rate in history between 1949 and 1954, the decline was the result of a reduction in small, low-income farms.

The number of farms of the type that most of us would recognize as commercial farms actually increased in number. The decline in the low-income farms

Reprinted from Michigan Farm Economics, Published by Michigan State University, East Lansing, Michigan

represents the consolidation of these units into larger farms.

Is the Family Farm Holding Its Own?

The declining number of small farms plus rapid farm consolidation raises the question of whether the family farm has held its own. Or have the consolidations resulted in more large-scale, non-family farms?

To determine this, we must define a family farm. Let's say it is one on which the operator and his family provide the main source of labor and management—a farm large enough to make productive use of most of the operator's labor.

The census does not classify farms this way so we will have to apply our definition in a rough manner to the available census classifications. Let's call commercial farms with gross sales between $2500 and $25,000 in 1954 family farms, those with sales exceeding $25,000 large-scale farms, and those with sales less than $2500, small-scale farms.

Two other adjustments must also be made to compare recent times with the past.

First, farm prices vary over the years, so previous census figures have to be adjusted to make the dollar sales in different periods comparable.

Second, a farm family can now produce a much greater quantity of farm products than before, because of the rapid increase in the use of machines, fertilizers, and new technology. So, we must allow for these changes to make the figures comparable.

With these adjustments made, we find that the number of large-scale farms in the United States was the lowest in 25 years in 1954. Such farms made up the same percentage of the total in 1954 as in 1930.

The proportion of family farms in the total declined slightly from 1930 to 1940, but has remained about the same since that time. The proportion of small-scale farms rose slightly from 1930 to 1940 but has remained constant since that time.

There are some 2,400 kinds of snakes. They are native to all areas of the world except Ireland, New Zealand and the arctic regions.

Thus, it appears that family farms are holding their own in the rapidly changing farm economy. They have grown larger in size and their average volume of business has increased. But the large-scale farm does not appear to be increasing in relation to family farms in agriculture.

Is the family farm holding its own in sales? Even if family farms aren't increasing in relative numbers, large-scale farms

might be increasing in their proportion of total sales.

Family farms sold slightly more than three-fifths of the farm products in 1954. This was about the same proportion of the total as in 1929, and slightly above the proportion for 1939 through 1949.

Large-scale farms accounted for nearly one-third of all the sales of farm products in 1949, although making up only about 4 per cent of the total number of commercial farms. The proportion of sales by this group declined slightly from 1939 to 1954.

Small-scale farms made only about 6 per cent of the farm product sales in 1954, even though about one-third of the farms fall in this class. Their proportion of total sales has been quite constant for the past 25 years.

Thus, it appears that during the great depression, large-scale farms gained slightly in sales relative to other commercial farms. Since that time, the sales of family-sized farms seem to have gained slightly.

In 1954, the relative position of family farms was about the same as in 1929.

Summary

In summary, data from the 1954 census of agriculture suggests that the family farm has been able to cope with the rapid changes in agriculture as well as or better than other types of commercial farms. Perhaps the most surprising thing is the continued existence of many low-income, small-scale farms in American agriculture. About one-third of our commercial farms still seem too small to provide productive employment and adequate living for the farm families which live on them.

Search for Chestnut Trees Continues

A long search for survivors of the blight which virtually wiped out the chestnut tree in Amercia many years ago still continues. U. S. Department of Agriculture and cooperating agencies wants to locate live American chestnut trees of a satisfactory size.

Although chances are slim that a blight-free American chestnut can be propagated, efforts are still being made to do so. Landowners, and others, who find live chestnut trees are asked to report to their county agents or to their state Agricultural Extension Service's forestry department. Such trees should be at least eight inches in diameter (15 inches in circumference at 4½ feet above the ground or about a 10-inch stump). They should have one or more live branches. Chinese or hybrid chestnuts are not wanted.

—Virginia Extension

Farmers Turn to Crop Drying

Artificial drying of wheat and other grain insures quality, has other advantages . . .

Condensed from Kansas Farmer

WITH bumper crops of wheat, milo, and corn to store this year, keeping your grain in condition is going to be a major problem on many farms.

That is the reason more and more farmers are turning to crop drying to insure that the quality of harvested crops is maintained.

Agricultural Extension engineers at Kansas State College point out that by forced-natural-air drying during June and July, wheat and other grains can be harvested several days earlier than otherwise would be possible. It is quite easy to dry wheat with 15 to 16 per cent moisture content at a minimum of expense, engineers say. Aeration of grain after it is placed in the grain bin also is valuable to keep the grain in condition. This is especially important, engineers warn, for winter storage of grain.

In Ottawa county, Central Kansas, Vincent Pieschl, Jr., is equipped to dry wheat having a moisture content up to 18 per cent. He is using a metal bin equipped with a drying system that will handle grain to a depth of 8 feet.

The 1958 wheat crop on the Pieschl farm was binned with a moisture content of only 12.3 per cent and did not require drying. Had the crop required it, however, Mr. Pieschl could have done the job in the bin, then moved the wheat to other storage and used the same equipment for milo this fall.

Albion Avery, Riley county, Kansas, has rigged up a portable blower operated by an electric motor. This blower is used to dry grain in a permanent wooden bin in the granary. The same equipment also is used to dry grain in a metal bin on the farmstead. In this case, Mr. Avery chooses to move the dryer rather than move the grain.

Reprinted by permission from Kansas Farmer, Topeka, Kansas

If you are planning to dry future crops in either a permanent bin or a metal bin, Extension engineers have a word of advice. Be sure to install enough ducts and make them large enough. There is a tendency among those installing such systems to provide too few and too small ducts. Rectangular ducts allow more air passage than triangular ducts, too, which is a good point to remember.

If owning your drying equipment is not advisable or practical you may find it worthwhile to have your crops custom dried at the elevator, at a neighboring farm, or in the field.

This year Roland Irvine, of Riley county, Kansas, began his milo harvest late in September because he was able to hire the custom drying service of a neighbor.

Milo harvested came to the dryer with a moisture content of 14.75 per cent. It then was dried out to between 11 and 12 per cent before being binned under government loan. Cost of drying was 15 cents per hundredweight.

Henry M. Riner, Sedgwick county farmer, is equipped on his farm to offer his neighbors a crop-drying service. He can handle a 200-bushel truckload at a time on a custom basis and says he can reduce moisture content of grain by 5 per cent in one hour.

He has built a bin to hold one load so farmer customers can be hauling to and from their farms while grain is being dried. Cost of the service runs about 10 cents per bushel, Mr. Riner reports.

Extension engineers at Kansas State College point out the following 10 advantages for grain sorghum drying:

1. Earlier harvesting date.
2. Easier to plan harvesting date.
3. Later maturing hybrids can be used for higher yields.
4. Able to sell on an earlier market.
5. No moisture discounts.
6. Elimination of spoilage in storage.
7. Harvest in pleasant fall weather.
8. Allows time for fall plowing.
9. May make it possible to eliminate one combine.
10. Allows for a better balanced feeding program.

Surveys show that a college graduate can expect to earn about $100,000 more in a lifetime than a high school graduate. When figured on the basis of investment and return, this would be a cash return about 20 times the $4000 to $5000 investment involved in a college education.

"Give Us More Crossbreds"

Corn belt feeders like crosses of purebred beef breeds. They gain fast and grade well . . .

Condensed from Farm Journal

Dick Braun

CATTLEMEN are quick to use scientific discoveries. Hormones, antibiotics and gain-tested breeding stock have all chipped in to speed and cheapen the fattening of cattle.

"But probably the easiest way of all still lies dormant," complains an Ohioan.

He was talking about crossbreeding—not the "casual" mating of grades but *scientific crossing of top animals* from the different beef breeds.

Actual feedlot tests show this kind of crossbreds out-gains their straightbred "cousins" by 5% to 20%. And the idea may not be as dormant as the Ohio feeder thinks. In fact, it could be the next big change in cattle raising. Why?

1. We're beginning to do less "eye appeal" cattle buying, based on color. We've already taken this step with hogs, where on many markets 90% or more, are crossbreds.

2. In some cases, crossbreds are bringing a premium, both as feeders and finished cattle.

3. Semen from production-tested beef bulls is now available from many bull studs. It makes crossing easier.

Why change now, after all these years of down-grading crossbreds at the market?

First, there's a switch in thinking among some market men. Billy Clouse, 20-year Indiana feeder, claims that *he now gets more for fat crossbreds* than for straightbred cattle at the sale barn where he sells. Not many farmers do, but at least they're not taking discounts as often as they used to.

As Armour's head cattle buyer in Chicago puts it: "All cattle are graded on their merits, and in our opinion that applies to crossbreds as well as others."

Trouble is, you can't always find that practiced in the buying pens.

"Let's face it," says an Indianapolis cattle buyer, "Crossbreds have less eye appeal." He's referring to uniformity of color,

Reprinted by permission from Farm Journal, Philadelphia, Pennsylvania

which has about as much to do with actual value as the curl of a steer's eyelashes.

But this buyer makes another point. "With crossbreds we suspect that there might be a ringer in the bunch—one with dairy blood—so we look harder."

That's the reason why crossbreeding has been dormant for so long. Some cross-breds *are* mongrels, with a little bit of everything but goat blood.

But, look what cattle feeders have to say about well-bred, crossed cattle of the English breeds:

Two big South Dakota feeders sat around a Chicago lunch table recently, talking crossbreds.

"We used to buy crossbred feeders for less than straightbreds," recalled Les Zeller. "But cowmen are getting smarter. Sometimes crossbreds outsell the others now. But we still buy all we can get."

Zeller figures you can't beat a good Hereford-Angus cross. His tablemate, La Roy Dahlerup, favors Angus-Shorthorn.

"I had a few of those blue roans one year that out-gained my straightbreds by ¼-pound a day. Not hard to see why I like 'em."

"But never sell less than a load of crossbreds. If you have just a few in a load, buyers like to clip you," he cautions.

Cattlemen from Nebraska to Ohio agree that good crossbreds out-gain straightbred cattle. Some know it simply by watching them in the feedlot. Others have made the scales prove it.

One of these is E. L. McWhinney in Illinois. He feeds cattle for a Wyoming ranch where Hereford heifers are bred to Angus bulls. Last year, McWhinney fed 100 of that Here-

Today, about 17 minutes of working time will buy a dozen eggs, but 40 years ago it took 87 minutes. In 1948, it took 30 minutes working time to buy a pound of meat, but by 1957 the time factor was down to 19 minutes. Average retail price for a pound of beef in 1948 was 75c, but only 70c in 1957.

ford-Angus cross, as well as 261 straightbred from the same ranch.

The later-calved crossbreds weighed 265 lbs. when he unloaded Nov. 1, 1956. The straightbreds weighed in at 300.

When McWhinney sold the cattle on November 29, 1957, the crossbreds averaged 1,025 lbs.—25 pounds more than the others. And they brought 50c more a hundred!

"We shop for a good Shorthorn-Hereford cross," says John Curtis who manages the feeding of several thousand cattle a year for farm-owner clients. "They're

real good do-ers, and I've never taken a discount on the finished cattle."

Crosses are getting harder to find. Complains Billy Clouse: It's getting so you have to have special contacts to get a chance at the few western crossbreds available. And then they cost $2 to $3 more per calf."

Of course, that's not hard to take for the rancher. And, contrary to popular opinion, producing crossbreds can be little more trouble than sticking to one breed.

If you work it like John Frederick does in northern Michigan, it's no trouble at all. He has well-bred Hereford and Angus cows. He puts in a Shorthorn bull for three years and sells all the calves. Then he uses a Hereford bull for three years and saves replacements from the Hereford cows. Finally, he buys an Angus to get replacements from his Angus cows.

That completes a nine-year cycle. It gives Frederick straightbred replacements, which he must have to keep the system working, and mostly crossbred feeder calves.

Are crossbreds worth the fuss for the calf raiser?

"You bet!" replies Clark Metcalf, Fayette County, Ind. cow-calf man. "I'm weaning 80-pound heavier calves from a Hereford-Angus cross than I did from straight Herefords."

Metcalf has well-bred Hereford cows and breeds them to registered Angus bulls. His fed cattle have good feed conversion and carcass yield — two facts that crossbreds have proven across the Corn Belt.

Crossbred cattle offer a big, new untapped way to make more money in the cattle business—if (1) good quality, well-bred animals are used in systematic crossing; and (2) you avoid the fat-cattle buyer who won't pay what the cattle are worth.

Fortunately the first is becoming more plentiful and the second more scarce.

Fowl Cholera Vaccine Being Developed

Fowl cholera, a poultry killer for many years, may soon be wiped out. U. S. Department of Agriculture scientists have developed several vaccines which show excellent possibilities for fighting the disease. The department is continuing the experiments to determine which preparation and dosage are most effective. The results should make it possible shortly to vaccinate poultry under field conditions where natural outbreaks of cholera are prevalent.

Chimney Smoke

by Irene Rudie

What can I give Him,
Poor as I am?
If I were a shepherd
I would bring a lamb,
If I were a Wise Man
I would do my part,
Yet what I can give Him —
Give my heart.
—Christina Rossetti

★ ★ ★

If these were the "good old days"—before lockers and freezers—it would now be safe to butcher some of the winter supply of meat, and how good that fresh beef or pork would taste after a summer of salted, or canned meat, and chicken!

★ ★ ★

The first real snowstorm of winter imprisoned the owner of the local shoe store for the day. He was so busy selling overshoes he couldn't even leave the store for lunch.

★ ★ ★

The rural telephone lines hum these days, and the operator is extra busy as we all call relatives or friends for addresses we can't find for our Christmas card lists. Our own operator will even look up an address in the Twin City directory for us! Dial telephones could never give us such service.

I saw a lovely outdoor manger scene on my way to town the other day. The figures of the Nativity were cut of plywood and painted, and were arranged in a stable made of bales of hay. The bales made a solid, realistic background, and were still usable as feed afterwards; perhaps they brought a little blessing with them to the barn.

★ ★ ★

Our neighbor's dog got into the outdoor manger scene last year. He pushed aside the big doll in the Infant's crib and curled up to sleep there on the straw himself.

★ ★ ★

A man has a different tool, in suitable sizes, for every job that comes up around the house, but a woman makes out pretty well in fixing things with a stove poker and a butcher knife.

★ ★ ★

A young mother took her three-year old daughter shopping and bought a sweater for the little miss and dark glasses for herself. The child insisted that she needed glasses too, and when pressed for a reason she said, "because my eyes get cold too!"

The Blackbird Problem

There's nothing more frustrating, but little you can do about it . . .

Condensed from New Jersey Agriculture

Ordway Starnes

THE increasing frequency with which farmers are reporting extensive crop damage from blackbirds demands that this problem be critically studied.

We need to determine the extent to which various species of birds are involved, kinds of crops which are most susceptible to damage, and the total amount of such damage. All this with a view toward developing effective control measures.

The redwing blackbird, the cowbird, the bronzed grackle, starling and certain other minor species of birds are collectively called "blackbirds." While the range of certain species is restricted, the term is so inclusive that blackbirds can be said to occur generally throughout the United States. Some species are migratory, others remain throughout the year.

Most species are seed eaters and marsh lovers. States with extensive marsh areas abounding in native grasses and with cultivated crops within easy flight range as food sources plus adequate cover, provide ideal environment for blackbirds.

We all agree on the aesthetic and practical value of birds, even including several classed as blackbirds. However, these desirable characteristics must be weighed against the crop damage referred to above.

Neff and Meanley of the Arkansas Station found that from April to August the majority of the food of the adult and essentially all the food of the nestling redwing blackbird was made up of insects. Insects made up a smaller percentage of the total food consumed by the cowbird and the grackle in the same period. In all instances the ratio of vegetable to animal matter in the diet increased rapidly beginning in August which coincides with the beginning of the more extensive crop injury by blackbirds.

Extensive damage to commercial crops has been largely confined to the grains, particularly corn, and to certain fruits in-

Reprinted from New Jersey Agriculture, published by Rutgers Agricultural Experiment Station, New Brunswick, New Jersey

cluding cherries, plums and grapes.

Outstanding examples of blackbird depredation observed last season included the loss of extensive plantings of sweet and field corn grown for seed production. Serious losses also occurred through lowered market value of sweet corn and a reduction in the yield of field corn grown for grain.

In small plantings and in the home garden, blackbirds frequently damaged more kinds of crops and these to a greater degree.

Control Measures Are Inadequate

Several methods are being used to reduce crop injury. The more important are listed here primarily for the purpose of recognizing that each has one or more serious limitations.

Worthwhile *farm management practices* may often be employed at little or no expense. Planting after the spring migration is over, harvesting prior to the beginning of the fall migration, avoiding the planting of crops susceptible to damage adjacent to woodlots and the eliminating of brushy cover adjacent to susceptible crops are among those reported to have been employed with a good degree of success. Disadvantages to employing these methods are apparent in that market price, soil productivity, growing season, and numerous other factors compete to determine when and at what time a crop should be grown on a given farm.

Tractor fuel costs may be greater than the total of all other machinery repair and operational costs on the farm. Fuel bills often exceed $400 per tractor per year.

Repellents Evaluated

Repellents are being continuously evaluated for the protection of crops in various parts of the country from blackbirds. A limited amount of work has been conducted in New Jersey. Results of this work suggest that while several repellents are promising, each has serious limitations usually including those of limited efficacy and great expense. While satisfactory bird repellents are not available at this time, promising repellents should be evaluated as they become available.

Numerous methods involving *frightening* have been used with varying degrees of success. In order to be effective these methods must be employed as soon as birds begin to feed in the field. They must be timed correctly and they must be used persistently. Frightening methods that have been most effective, either singly or in combination, include patrolling or taking a shooting stand in a field with firearms (the

.22 caliber rifle is reported to be more effective and less costly to use than the shotgun), rope firecrackers, skyrockets, and moving objects such as foil and light metal whirlers and aerial patrols. These methods are frequently too costly in terms of labor and material to be practical.

The killing of certain blackbirds is authorized by State and Federal laws. (Detailed information on this subject can be obtained from your state Division of Fish and Game.)

Population control methods being used or evaluated include trapping, shooting, the use of poisoned baits, and roost bombing. Unfortunately, each of these methods has serious limitations when employed against species of birds which may feed in an area of up to several miles from the roost.

Shooting Not Practical

The use of traps and shooting for population control has not proved practical primarily because of the number of birds involved. Poisoned baits and roost bombing are reported to have been used with considerable success. However, extreme care must be exercised in the use of any non-selective method of killing such as these because of the hazards to protected birds and to other animals.

While studies have been conducted for many years on the subject of blackbird depredation to crops, practical control measures have not been developed.

Biologists of the Federal Fish and Wildlife Service have been invited and have expressed interest in participating in blackbird research in New Jersey. Current negotiations should culminate in the activation of research primarily concerned with population control during the soming summer.

A Little 2,4-D Will Control Weeds in Oats

Ten to 20 cents will buy enough 2,4-D to keep weeds out of one acre of oats or other small grains, according to Dr. E. O. Burt, Florida Agricultural Experiment Station.

He says broadleaf weeds such as wild mustard, wild radish, sorrel, pigweed and lambsquarter can be killed in small grains by the use of 2,4-D in the amine formulation. Apply the chemical at the rate of ¼ to ½ pound acid equivalent per acre, he adds. Since most commercial formulations contain four pounds acid equivalent per gallon, one-half to one pint of the commercial formulation will treat an acre of small grains. —*Florida Experiment Station*

Will There Be Enough Farmers?

Now is the time to face the growing shortage of trained agriculturists . . .

Condensed from
New Mexico Extension News

Dr. Roger B. Corbett, President,
New Mexico A & M

THE most severe shortage in America, in recent years, has been trained engineers. Twenty years hence, the most severe shortage may be men and women trained to produce food and fiber on our country's farms.

Food and fiber come first. Until a nation has food and clothes, it makes no progress in manufacturing, in the arts or in the sciences. A shortage of trained, agricultural persons could hurt our nation more than a shortage of trained engineers.

The percentage of our people on farms and ranches has declined for about a hundred years. Some think that eventually 2 per cent of us can feed the rest of us! If this is true, what an important 2 per cent these people will be. The welfare of the nation will depend upon them. They could be likened to the point on which our economic top spins. If that point becomes dull and inefficient from lack of training, then the whole economy would wobble. So the important question is, "Are we training enough young men and women to keep even 2 per cent of our people sharp and efficient on our farms and ranches plus those in the business services that producers must have?"

One nationwide study shows that our need is for 15,000 trained men and women a year in the businesses that serve agriculture and to operate our farms and ranches. The output of our colleges is 8,500 a year, just a little more than half of the need for these trained people. This is a shortage that is becoming more and more serious with each succeeding year.

In New Mexico, the PTA's, cooperating with the Extension Service have done something about it. New Mexico is one of our most agricultural states. About 50 per cent of its people are classed as rural. This is a strikingly higher percentage than the nation as a whole.

Reprinted from New Mexico Extension News, State College, New Mexico

The first results of the New Mexico study show that there is a need for about 378 trained men and 134 trained women each year in the state. At the moment, the supply appears to be about 60 trained men a year and about 30 trained women.

The PTA-Extension Service study also has shown that about 52 per cent of the boys now in the sophomore, junior, and senior classes of high school plan to go to college. This is a high percentage. In these same classes, about 48 per cent of the girls plan to go to college. Of the men that plan to go to college, only 12 per cent now think that they will take agriculture; of the women a little less than 12 per cent now think they will take home economics. These percentages indicate some improvement over present-day conditions, but not nearly enough to meet the need.

Most amphibians have transparent eyelids, which permit them to see under water, or, to look around without getting water in their eyes.

What are the opportunities for trained boys and girls in agriculture and home economics? The preliminary figures which the New Mexico study has produced show that an agricultural graduate can expect to start at an average salary of $4,451 a year. The study also shows that the highest salary that these same boys can expect to earn in their life time is about $9,068.

In home economics, the beginning salary on an average is $4,256 a year, and the highest salary that these girls can expect to earn is $7,575 a year. Is that enough to attract the best young men and women? How does it compare with other opportunities? These things must be taken into consideration if we are going to do something about this growing shortage of persons trained for agriculture and home economics.

If each of the states in the Union would make a comparable study, we would have a national answer that would be really significant. Clearly, this is a challenge that is worth the time and thought of all agricultural leadership in America.

The United States cornbelt contains some 150 million acres, about 1/3 of which is planted to wheat yearly.

Here are some things that these leaders can do to help in this situation:

1. Encourage a study in your state to determine the need for people trained in agriculture and home economics.

2. Determine the supply of persons that are being trained for these two fields.

3. Work with your high school principal to improve school facilities for the training of agricultural and home economic classes.

4. Promote career days for high school students so they will become familiar with the opportunities in agriculture and home economics.

5. Help to develop favorable attitudes toward this subject on the part of students so they realize the importance of "food and fiber" to our nation.

6. Work with newspaper editors, radio and TV people to establish a public consciousness of the need for college-trained persons in agriculture and home economics.

7. Work for a lay understanding that will tend to give larger rewards for the boys and girls trained in these two fields.

It would appear that anything that we can do to increase our supply of college-trained workers in agriculture and home economics in the professional fields and on the farms and on the ranches will be a great help to our nation 20 years from now.

Advise Caution on New Poultry Lighting System

Poultry raisers are urged to go slow in adopting an extensive controlled-lighting system—called "stimulighting"—with their laying flocks.

Holding the caution sign is T. E. Hartung, extension poultry specialist at Colorado State University. "The new system is complicated," he explains. "While we know there is some response in the form of increased egg production, we do not yet know why."

According to the system, the producer severely limits the lighting for the growing pullets. The birds are restricted to six to eight hours of light per day when they reach about six weeks of age until they are 20 weeks of age. Then starting at 20 weeks of age, the light is boosted at the rate of 18 minutes of light per week. By the time the birds have been in production for a year, they will be receiving 21½ hours of light per day.

For some reason which scientists have not been able to pinpoint, hens under "stimulighting" apparently produce more eggs than those kept on a conventional lighting system. However, these results have been obtained through only limited numbers of tests.

—Colorado State University

Analyzed for Efficiency: Parlors vs. Stanchion Barns

A Dairy Specialist reviews management studies and analyzes different milking practices . . .

Condensed from Western Dairy Journal

C. L. Pelissier, University of California

THERE is still a great deal of controversy on parlor barns vs. stanchion barns, at least in California. New construction in this state still favors the stanchion barn by a wide margin.

The issue is so greatly influenced by other factors—particularly management—that it is difficult to have confidence in any measurements.

The Dorman study (University of California, Mimeograph), involving three parlor barns and five conventional barns, showed essentially this: The total time required to handle individual cows at least once in the parlor barns was comparable to the time of changing groups of cows in conventional barns. Even though the stanchion barns had a slight advantage, the difference was beyond our confidence limitations.

The question comes up repeatedly as to whether or not high-producing cows have sufficient time in the parlor barn to consume the proper amount of concentrates. This question may be one of the main reasons why we do not have more parlor barns in the Los Angeles area, a heavy grain-feeding district. Some dairymen feel they have solved this problem satisfactorily by feeding pellets, feed that cows eat faster. Others have developed feeding facilities outside the milking barn so that at least part of the concentrates can be fed elsewhere.

Comparison

We had a chance to compare a 10-stall elevated parlor barn with a 60-cow stanchion barn on the same dairy and under the same management. Both barns were equipped with pipelines and feed meters. The grain fed to the cows was limited to an 8 lb. average, with a 12-lb. maximum. Table 1 gives some details regarding labor organization; Table 2

Reprinted by permission from Western Dairy Journal, 4511 Produce Plaza, Los Angeles 58, Calif.

summarizes the results of the 6-month study.

This study contained too many "bugs" for conclusive evidence. There is, for example, no proof that the producing abilities of the cows were made equal by the large numbers involved.

A special summary was made of the heifers whose first six months of lactation was included in this study and who were assigned to the barns at random. Since stage of lactation was the same, their records were not complicated by the variation in production often found during the latter months of lactation.

TABLE 1

	Parlor	Stanchion Barn
Capacity	10 stalls	60 stalls
Milkers	4-2 shifts	4-2 shifts
Units per Man	5	4
Cow Washer	2	2
Cleanup Man	1	1
Cow Chasers	1/2*	1/2*
Cows per Man (5 months)	61.9	62.0
	7 1/2	7 1/2

* Same man moved cow strings for both barns.

TABLE 2

	Parlor	Stanchion Barn
Av. Number of Cows Milked	464.0	442.5
Av. Number of Cows Milked*	464.4	465.0
Av. Time Required/Milking*	4-1/3 hrs.	4-1/3 hrs.
Av. Daily Milk Production/Cow	40.0 lbs.	38.6 lbs.
Av. Daily Milk Production/Heifers**	40.8 lbs.	42.0 lbs.
No. of Heifers with 6-mo. Records**	70	120
Av. Total Number of Heifers	323	337
Standard Deviation	2.7	2.1

* Figures represent 5-month average because numbers of cows and milkers in the two groups were not balanced the first month.

** Herdsman Marlow Stark reports (Feb. 1, 1958) milkers in the parlor barn now finish milking from 20-30 minutes sooner than in stanchion barn.

These heifers were all raised and fed together after weaning until freshening. They were amazingly uniform in regard to age, size and condition at parturition. The incidence of mastitis in the entire herd was exceptionally low. It is felt that a comparison of these heifers involves considerably less influence from uncontrollable environmental factors than a group comparison.

Allowed Time

Management in the parlor barn allowed time for high-producing cows to consume the maximum 12-lb. of grain allowance. With five stalls available on each side, a slow-eating cow could be allowed extra time without slowing down the milking procedure. The concentrates fed were bulkier than most dairy feeds. This factor may have speeded up the slow-eating cow.

The average American consumes 5½ pounds of food daily.

Milking practices were very similar in both and were closely supervised by the same manager.

It was quite evident that the milkers in the parlor barn were on top of their work more than the milkers in the stanchion barn. When something disrupted routine in the parlor barn, milking units would tend to remain on the hook; in the conventional barn, the units remained on the cows. This did not seem to influence the incidence of mastitis, but a 6-month test is not long enough to form a definite opinion on this point.

It also was quite evident that the milkers preferred to milk in the parlor barn because they could handle the work with greater ease.

Under these conditions it would appear that the two barns offered equal opportunity for the cows to produce. Labor efficiency was very similar. No differences in milk quality were indicated by routine bacteria counts and flavor checks.

It must be emphasized that the milkers in this dairy were carefully selected, exceptionally well-trained and rigidly supervised. All barn help attend training sessions conducted biweekly by the manager. Results under less competent management might have been different.

Some ancient legends of the American Indian compare quite closely to Bible stories in many respects.

As a matter of interest, this herd averaged 447 lb. fat in the year the study was made and 524 lb. fat in the following year.

(Editor's Note: Since his story was prepared, author Pelissier has

called attention to some rather significant production differences. Following completion of these trials — conducted at Sherman Thomas Dairies, Madera—it became evident that cows in the elevated parlor were consistently out-producing those in the conventional stanchion barn. Western Dairy Journal contacted herd manager Marlow Stark, who verified that the production of the "parlor" cows was higher and more persistent than their mates in stanchions — in spite of the fact that the number of units in the stanchion barn was reduced.

Active farmers are the most important buyers of farmland, purchasing about three-fifths of all farms and farm tracts sold.

Stark believes that the difference can be explained, in part at least, as follows: In the elevated parlor, the machine is usually ready to go on the cow directly after she enters the stall, and the cow is "conditioned" to let down her milk immediately. In the conventional stanchion barn, the cow must be prepared for milking and may be in the stanchion for some time before the milking machine is applied. In the interim, environmental conditions are apt to interfere with her milk "letdown.")

A rather interesting analysis of Arizona DHIA records was made in 1956. The herds with stanchion barns and the herds with parlor barns both averaged 348 lb. fat per cow.

Over 90 per cent of the broilers produced in the South are grown under some sort of contract.

TABLE 3

	No. of Herds	Cow Years Reported	Avg. Milk Prod.	Avg. Fat Prod.
Stanchion	114	6,931	8,994	348
Parlor	91	6,825	9,348	348

The distribution of the herds in the various production categories was also very similar.

Size of Herd A Factor

Influence of herd size on labor efficiency has been shown by several studies. These reports are not all in accord, mainly because of the methods of analysis. The southern California study provides us with a considerable volume of records which are summarized in Table 4.

TABLE 4

Line No.	Herd Size	No. of Records	Avg. Milk Production	Hours per 1000 lb. Milk
1*	Under 50*	10	37	7.9
2*	50-99	15	37	6.2
3	Under 100	25	37	6.5
4	100-199	37	38	4.9
5	200-299	23	38	5.0
6	300 over	26	38	4.6
7	Average	111	38	4.9

* Lines 1 and 2 represent a further breakdown of line 3, on the basis of cows milked.

On the basis of this table it would appear that labor efficiency is more difficult to achieve with smaller herds. Several factors support the validity of this conclusion. Smaller herds cannot support the same overhead for labor-saving equipment that large herds can. Some chores are only remotely related to cow numbers. For example, the time it takes to assemble and clean milking equipment is influenced very little by how many cows are milked.

Smaller dairies are likely to use more family labor than larger dairies and the incentive for efficient labor is less when labor charge is not a cash cost. Smaller dairies do not provide as much opportunity for job specialization; movements cannot be organized to be as efficient if one man handles a greater number of chores. There is more chance for time bottlenecks. There are some, perhaps, who would dispute this reasoning.

Production is one of the most important factors in the efficiency of milking barn operations. Other factors being equal, a cow that daily produces 60 lb. milk requires very little more milking labor than does a cow that produces only a fraction of this amount.

In spite of some disagreement, I believe that level of milk production is one of the greatest factors—if not the greatest factor—influencing labor efficiency in the milking barn. Emphasis on barn design and equipment has distracted attention from this important factor.

Organizing Work

Work organization is most difficult to analyze. Individual ability has so strong an influence on results that developing a realistic yardstick for the factors involved is nearly impossible. Yet work organization is a major factor in labor efficiency.

The Dorman time-and-motion study points out some of the factors as well as any study en-

countered, even though only eight herds were involved. This study focused attention on the wide variation in the time required for milking barn chores. It was rather evident that washing cows, stripping, changing machines and changing cow strings were the most labor consuming chores.

Cow-washing time was greatly influenced by how clean the cows were kept and convenience of facilities. Since this between milkings, work organization study was done, a number of our dairies have installed sprinklers—in the floor of the holding corral. A few newer stanchion barns have sprinklers, installed on the floor just behind the front feet, that spray back to the udder. Presoaking by sprinklers is thought by many dairymen to reduce cow-washing time in the barn.

Stripping time was influenced

In Norway, Sweden, Finland, Portugal and Switzerland, restocking cutover woodland is required by law.

a great deal by opinion on proper technique. This study showed that it is possible to strip properly in minimum time. Training the cows to strip quickly following their first freshening was thought to be a factor in fast stripping. Proper machine-stripping, of course, reduced the amount of hand-stripping required.

It is fortunate that the recommendations for efficient milking and mastitis prevention are compatible.

The time required for changing cows depended a great deal on type and size of barn, corral and land arrangement, stanchion arrangement, size of herd and work organization.

Because of variations in milking barn procedure, it was not possible to separate the time required to change milking ma-

About 74 artificially bred cows out of each 100 will conceive on first service.

chines from the time required to carry the milk to the dump tank. The type of equipment used was of great influence on the time required to change machines from one cow to another. Pipeline milkers greatly reduced or eliminated the carrying of milk, depending, of course, on stripping practices.

Distance to the dump tank was also a factor that influenced the time required to carry and dump milk with bucket machines. A few spare milking machine buckets enabled the machines to be in operation while the milk was being carried to the dump tank in more efficient operations. It was also rather obvious that a

milker's ability to reduce waste motions was an important factor.

Factors

Work organization, convenience of equipment and type of equipment were also among the most important factors influencing the time required to complete chores of lower time requirement.

In conclusion, it should be emphasized that labor efficiency alone should not be the dairyman's objective. Labor efficiency should not be gained at the expense of more important factors. Under California conditions labor costs constitute about 20% of the total cost of milk production. Improvements in labor efficiency at the expense of production, herd welfare, and other factors of importance to net income are not desirable.

Implants Have Place in Cattle Programs

Cattle feeders who wish to get the extra gains provided by stilbestrol implants may safely do so. But G. R. Carlisle, extension livestock specialist at the University of Illinois College of Agriculture, has some suggestions for using implants that will keep the side effects down to a minimum.

Don't use implants of more than 24 milligrams on calves and 36 milligrams on older cattle, Carlisle suggests.

Implant steer calves in the fall before the wintering program begins. This implant will last from seven to eight months. Farmers who want to use stilbestrol after that but who are afraid of side effects may feed it.

Implant plain-quality steers. A few side effects on these cattle will not appreciably affect their selling price.

—*Farm News*

New Black Leaf 40 Not Compatible for Sheep Drench

A warning to sheepmen concerning the new, improved Black Leaf 40 is forthcoming from Virginia specialists. They say the new preparation of Black Leaf 40 *cannot* be used safely in preparing the cunic drench for sheep.

A wetting agent has been added to the nicotine sulfate in the new Black Leaf 40 which makes it incompatible with the copper sulphate which is generally used in a sheep drench, the specialists explain. The cunic drench is used by many sheepmen as a control of internal parasites.

—*Virginia Polytechnic*

Can Beef Cattle Finance Soil Improvement

If you are a good manager you can pay for a profitable soil improvement program on hill land by raising beef cattle . . .

Condensed from Ohio Farm and Home Research

R. H. Blosser

INCOME figures show that with top grade management, beef cattle can pay for a major soil improvement program on hill land such as exists in southeastern Ohio. This conclusion is based on raising a beef breeding herd on 500 acres, and selling the young cattle at slaughter weights averaging 850 pounds.

By top grade management is meant above average quality livestock; a minimum investment in machinery, fences and buildings; efficient use of labor; a well-balanced pasture program; high crop yields; and a 93 per cent calf crop raised to marketable weights.

A soil improvement program will increase annual profits after some of the additional expenditures for lime and fertilizer have been recovered if management is at its peak. But until the fifth year of the program, net cash income will be less than before any changes were made. About seven years will be needed to increase hourly returns to labor because labor requirements increase as more crops and livestock are raised.

Need More Income

If $2500 plus the use of a house are used annually for family living, some off-farm income will be needed to finance the first four years of the soil improvement program, even if all capital is owned by the operator and no interest charge is made for its use. If four per cent interest is charged against all capital used, considerably more off-farm income will be needed to finance the first six years of the program. Stated somewhat differently, if $2500 are used annually for family living, no payments on interest or prin-

Reprinted by permission from Ohio Farm and Home Research, published by The Ohio Agricultural Experiment Station, Wooster, Ohio

cipal can be made out of farm earnings before the fifth year.

With top grade management, about seven years will be needed before cash receipts and increases in inventory will be sufficient to pay all previous costs of the soil improvement program. This is about two years longer than the time needed to increase annual net income above the amount received before any changes were made. These time requirements are based on producing 195 pounds of beef per acre of land used by the cattle; 1951-55 farm prices and production costs; a four per cent interest charge on all capital invested; and a payment to all labor of 75 cents an hour.

The preceding conclusions are based on a slaughter cattle price of $24.00 per hundred pounds after hauling charges. This was the average Chicago price from 1951-55 for animals grading good. If $23.00 per hundred pounds were used to calculate slaughter cattle receipts, the length of time needed to finance the program would be increased to 10 years. A price of $26.00 would reduce the time needed to five years. Farm earnings under top grade management would not be great enough to pay all costs of the soil improvement program if average slaughter cattle prices fell below $21.00. In calculating costs, all family labor was assumed to be paid 75 cents an hour plus the use of a house, and four per cent interest was charged on all capital invested.

Takes Ten Years

Suppose beef production averaged only 150 pounds per acre of cropland and improved permanent pasture, or about three-fourths the amount produced by a top grade beef farmer. Under these conditions the price of slaughter cattle would have to average about $25.50 per hundred pounds to pay all soil improvement costs within 10 years. A price of $28.00 would be needed to reduce time requirements to six years. This level of production would not pay all additional costs if the average price of slaughter cattle fell below $23.00. These figures may look somewhat discouraging, but calculations also show that if no soil improvement work was done, labor and capital could not be paid average rates unless slaughter cattle prices averaged more than $23.50 per hundred pounds.

Purchased animals for the dairy herd should come from healthy herds. Newly purchased animals should be isolated for at least 30 days.

Size of farm studied was 500 acres. This amount of hill land in Southeastern Ohio is needed

if a beef enterprise is used to employ a typical farm family full time. Acreages in specific crops were as follows: corn, 22; wheat, 22; oats, 13; meadow, 75; permanent pasture, 168; woods, 150; and miscellaneous, 50.

If smaller tracts are used only for beef production, family income will be less than this study indicates unless some off-farm income is obtained. However, part-time farmers on average size farms should be able to finance a major soil improvement program easier than full-time farmers on larger farms. Reasons include smaller investments in lime, fertilizer and additional livestock. Also, a job in town often pays considerably more per hour than beef cattle.

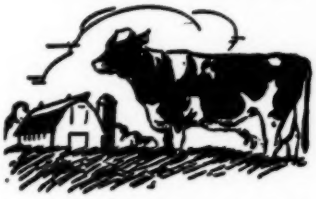
Receipts, expenses and net income were calculated so that everything was kept the same except the soil improvement program. This was done for nine consecutive years after the program was started and one year before any changes were made. Crop yields before the improvement program was started were: corn, 45 bushels; wheat, 20 bushels; oats, 30 bushels and hay, one ton per acre. No contour strips were used. Fertilizer was used at the rate of 200 pounds per acre of 3-12-12 on corn and small grain. A half ton of lime was applied every four years.

Crop yields in the ninth year of the program were as follows: corn, 65 bushels; wheat, 26 bushels; oats, 40 bushels and hay, 2.8 tons per acre. These yields were based on the use of contour strip cropping and fertilizer applications of 250 pounds per acre of 5-20-20 on corn, wheat and oats. First year meadows were top-dressed with 200 pounds per acre of 0-20-20 fertilizer. Applications of lime included four tons per acre for the first rotation, two tons for the second and one ton each rotation thereafter for maintenance.

Permanent pasture yields before the improvement program was started were based on using no fertilizer or lime. Yields during the improvement period were based on using three and one-half tons per acre of agricultural ground limestone followed by one ton every four years and 425 pounds per acre of 0-20-20 fertilizer every three years.

Cows may give milk with abnormally low fat content if all the forage in their rations has been too finely ground, or if their diet consists of a small amount of long-chopped hay and a large amount of grain. Such rations reduce the acetic acid from which butterfat is made.

Automation: Key to Dairy Profits



Bulk cooler, pipeline milker, and mechanized feeding permitted a larger herd without more labor . . .

Condensed from
Electricity On The Farm

Kenneth L. McFate, University of Missouri

IN THESE hectic days of competition, increased chore labor efficiency on the farm is one of the surest ways of making a greater net return. This is particularly true in dairying.

In 1957 Francis Kessler of Augusta, Missouri decided that if he were to stay in business, he would have to make these three major changes:

(1) *Reduce labor,* stop carrying milk in cans.

(2) *Sell Grade A milk* rather than condensory milk which he was selling at $2.95 per cwt.

(3) *Expand* his dairy operation into a more profitable unit.

Because of the sizable investment required, Kessler did some careful planning. He built a two-story 26-foot x 32-foot building on the "court" side of his old barn which is now used as a resting and feeding area. Grains are stored overhead and are gravity-fed to metering augers located at each of six elevated stalls in the milking room.

The area where most labor was eliminated is in the milking operation itself. Today—one year after milk plant conversion—Kessler and his wife, Betty, milk 92 cows in two hours, the same amount of time formerly required to milk 50 cows.

The type of bulk tank is important to Kessler. After looking at several, he purchased a 600-gallon tank of the vacuum type. With this type the milking operation becomes almost completely automatic once the milker units are placed on the cows' udders. With from 10 to 15 pounds of vacuum in the tank, milk is drawn directly from the cows to the bulk cooler through plastic, glass and stainless steel pipelines.

"With the milk cooler," Kessler says, "we have a greater return per dollar of investment than on the other equipment. And no milk cans to handle or carry."

Feed Operation Mechanized

Most of Kessler's past efforts

Reprinted by permission from Electricity On The Farm, 305 E. 45th St., New York 17, N.Y.

have been directed toward reducing time and labor inside of the milkroom and milking room. But he is not neglecting the labor and management of the *outside* operation either.

"I believe in feeding lots of silage," says Kessler. "I use upright silos for storage because losses are small compared to those in the self-feeding type silos."

When plans are complete, the silo unloader will take ensilage directly from the bottom of the silo and will place the material in a hopper at one end of a 75 foot-long automatic bunk feeder. This auger type distributor will place the forage evenly in the bunk where cows can feed from either side. All of this work will be done automatically with electric motors and controls.

"If properly handled, my 220 acres should raise enough hay and grain for my herd," says Kessler, "but Dad and I farm together and we intend to expand. A 600 gallon tank may seem large, but it is already too small for my operation. I'll have to trade it on a larger tank real soon. Even so, I think it will pay for itself in just a few years. I plan to expand my present operation further and operate without additional labor."

By using more automatic equipment and less labor in their expanded operation, the Kesslers will undoubtedly have a greater net return for those future years, when 3-year-old Tommy and 18-month-old Patty will be pushing switches or setting dials on these or on even more modern controls.

Think Nothing of It!

The biggest business in the world is getting bigger. But its ledgers are full of red ink.

It is our federal government.

Its debts are so great that they exceed the total amount owed by 171 million Americans on their personal notes, mortgages and installment payments.

It even owes more money than the total debt of all the corporations—big and small—in the United States.

It owns more land than anybody else in America, and it has more employees than anybody else in the country.

In this current fiscal year it is spending about $13,000,000,000 more than it is taking in. And thirteen billion dollars is as much money as all the farm families in America are earning in a year when farm incomes are up! —*Nation's Agriculture*

Built-In Bug Resistance

Scientists are testing old varieties and developing new ones . . .

Condensed from Research and Farming

C. H. Brett

FARMERS spend a lot of time and money to protect their crops from insect pests. Research has fought back with insecticides as the major weapon. This has paid off handsomely. We now have chemicals and application techniques superior to any ever known.

Improvements and refinements are made daily. Yet many complex problems remain. Insects tend to develop a resistance that enables them to overcome the killing power of a chemical. Insecticides up production costs. Also, only very small amounts of many chemicals can be tolerated on food plants.

"Resistant" Plants Show Promise

Use of plant varieties which inherently are less damaged or less infested by insects is one of the most promising ways to reduce costs and simplify insect problems. Such varieties are said to be "resistant." Resistance comes about in 3 ways: (1) a plant may not be preferred by the insect for food, shelter or egg laying, (2) it may adversely affect the biology of the insect (antibiosis), or (3) it may grow satisfactorily under levels of infestation that would severely injure or kill "susceptible" plants.

Find Resistance in Several Crops

Research workers at N. C. State College, aware of the great value of plant resistance to insects, are spending more time in this study.

Researchers recently reported that 2 different types of hairy cotton were damaged less by boll weevils than standard upland cotton varieties. Both hair density and hair length were important.

W. V. Campbell found that Mexican bean beetles reared on resistant snap beans laid only half as many eggs as those reared on susceptible varieties and the females were smaller. Resistant varieties were less preferred by the beetles and were better able to tolerate them.

Varieties of sweet corn were compared by C. H. Brett for resistance to corn earworms, Jap-

Reprinted from Research and Farming, published by North Carolina Agricultural Experiment Station, Raleigh, North Carolina

anese beetles, sap beetles and fall armyworms. The range of differences was considerable for all of these insects. Some varieties were resistant to all.

Resistance in hybrid field corn to wireworms and webworms was determined in 2 varieties by W. M. Kulash. A resistant hybrid produced 50% more than a susceptible one. R. K. De tested 10 varieties of hybrid corn for resistance to the rice weevil. Ears ranged from no infestation in resistance varieties to 30% in susceptible varieties.

The United States produces less than one-half the wool it uses in clothing. The remainder is imported.

Must First Determine Nature of Resistance

Sources of resistance must be determined before inheritance studies can be made. This requires careful screening of many varieties over a period of several years. When genetic characters associated with resistance have been identified another long period of hybridization and selection are needed for the production of a new variety.

It is possible that new varieties can be developed which will be immune to insect pests. Any degree of resistance will increase the effectiveness of control programs and decrease the effort and expense of crop production.

Self-Feeding Silos Cut Labor Needs

Efficient use of bunker silos saved farm labor according to a U. S. Department of Agriculture study.

Information comes from research with horizontal bunker silos used in self-feeding operations on 50 Illinois farms. Farmers found that labor averaged 40 minutes per day per 100 head of cattle when they used bunker silos equipped with self-feeding gates.

The farmers said that in this 40 minutes they could adjust the feeding gate, remove top spoilage or cover, clean the feeding floor, and loosen silage for the cattle. Loosening the silage is especially important because cattle may get sore noses from rooting out the packed feed.

Farmers found that each animal needs 3 to 4 inches of horizontal feeding space. County agents can furnish details on designing and operating bunker silos.

—University of Wyoming

Tractor Power Steering: Here to Stay

It makes a difference . . . gives you finger-tip control for all-day operations without fatigue . . .

Condensed from American Agriculturist

IS POWER steering worth $100 to $125 on your next tractor —or even on your present one, as an attachment?

If you've never used a tractor with power steering you might say that you can find other places to put that $100. And you probably can. But the simple fact is that power steering is here to stay. In recent years, some of the major manufacturers have been building in power steering on about 80% of models on which power steering is available.

In keeping with the growing trend of higher output per man, our tractors are getting bigger and bigger. Front-end loadings continue to increase. Front-mounted loaders, cultivators, corn pickers, etc., can make steering quite a task—especially the new 6-row cultivators, for instance. In order to lighten the task of steering, some of the power of the engine is used, through hydraulic pressure. This gives your arm muscles a welcome boost.

And for those who pride themselves in not needing any hydraulic help to turn that steering wheel, let them remember that the ordinary steering gear provides a considerable mechanical advantage that they accept without much damage to their pride.

There are some very real advantages to power steering; and although they may not be easily or exactly measured, this does not diminish their importance. We are hearing more and more about fatigue these days. For instance, manufacturers are spending thousands of dollars on better seats which cuts down fatigue.

And power steering's really great contribution is probably that it reduces fatigue. Of course it's important that you be able to turn the wheel rapidly when necessary, but that need may not occur throughout a very large portion of the total time you

Reprinted by permission from American Agriculturist, Ithaca, New York

spend on the tractor. However, if you can handle it like a breeze, all day long, you'll be less "beat" by night.

If you're fresher, you can think better, sharper, and clearer—and thinking is the essence of your management, which, according to Dr. Earl Butz, Dean of Agriculture at Purdue University, is the most important ingredient of your business.

Whether you operate the tractor yourself or use hired help, you will probably find that power steering is well worth its cost. After all, depreciated over a 10-year life, it will probably only cost $15 or so per year. That might be a small price to pay for improved employee morale. And if you trade the tractor after five years, you'll probably get half your investment back in a larger trade-in allowance. After all, a tractor with power steering will be easier for a dealer to sell as used equipment.

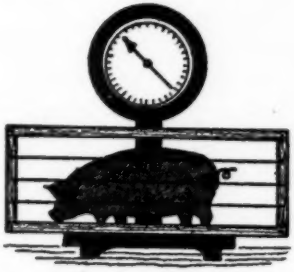
In general you need not be overly concerned about the difference between power steering systems offered by the various manufacturers. In fact, many designers have worked closely with suppliers of steering-gear and hydraulic equipment in developing power steering for their various models. And the cost is fairly consistent throughout the industry.

You can, of course, purchase a package for installing power steering on your present tractor. You might well ask whether such a package has been hard on steering gears—if your dealer has sold any previously. After all, your steering gears were designed for "armstrong" power, not the considerably greater hydraulic power—and shorter life is possible when you put power steering on. You might also drive a tractor that has such a package on it, to see if it responds rapidly enough at low engine speeds. This is a problem which may exist with package systems.

Don't relax your war on rodents; the rodents never relax their war on your crops.

If power steering is a luxury on a big tractor, then you must almost consider such devices as extra-cost hydraulic systems, extra-cost easy-riding seats, extra-cost independent power-take-off drives, extra-cost on-the-go speed-change drives, etc., as luxuries, too. They may be, but they increase your productivity, reduce your fatigue, or are convenient enough to be worth their cost to you. Today, more than ever, the world is not interested in building monuments to people for doing things "the hard way"—because "the easy way" is usually a more productive and profitable way.

Can You Breed Leanness Into Hogs?



Tests at Beltsville show swine selected for leanness will transmit part of this advantage to their offspring . . .

Condensed from Agricultural Research

HOW FAST and how much can you change the lean-to-fat ratio in hog carcasses through selective breeding?

This is being answered through basic studies at USDA's Agricultural Research Center, Beltsville, Maryland.

In three generations of selection in Duroc hogs, choice for low fat *decreased* backfat thickness by 11 per cent, while selection for high fat *increased* backfat thickness by 14 per cent. Animals chosen with significantly less backfat than herd average transmitted about 41 per cent of that advantage to their offspring. On the other hand, animals chosen with more backfat than herd average transmitted about 57 per cent of that disadvantage. Thus, selection was somewhat more effective in increasing backfat than in decreasing it.

Carcass samples of third-generation Duroc hogs bred for leanness gave 3 per cent more in yields of trimmed hams, loins, and shoulder butts than the hogs bred for fatness. At the same time, the specially bred fat-line Durocs averaged 0.6 per cent higher in bacon yields and 5 per cent higher in precentage of other fat cuts.

This means that for every 200-pound Duroc marketed, third-generation lean-line pigs averaged 6.2 pounds more lean cuts and 10 pounds less fat cuts than fat-line animals. The latter yielded 1.2 pounds more bacon.

These differences are large, of course. But progress in separating the lean-to-fat ratio in succeeding generations of the two lines may not be as rapid.

Selection in the Yorkshire breed is giving similar results. But more data are needed on the Yorkshires to tell just how effective selection will be in this breed.

Reprinted from Agricultural Research, published by Agricultural Research Service, U.S.D.A., Washington, D. C.

Fat Hog's Lean Cuts Have Best Table Quality

Tests of lean tissue for fat distribution and flavor showed that fat Durocs—with 15 per cent more intramuscular fat — produced roast pork with more tenderness, flavor, and juiceness than did lean Durocs. Carcass and flavor data for these tests are being provided by ARS food technologist R. L. Hiner and his associates.

ARS geneticist H. O. Hetzer is developing by selection a line high in fatness and one low in fatness in each of the two breeds. Primary criterion of selection is backfat thickness at a live weight of 175 pounds. Only secondary consideration is being given to such traits as litter size, growth rate, and conformation.

The average difference in backfat thickness between the lean-line and fat-line Durocs was 0.4 inch in the first generation, 0.19 in the second, and 0.37 in the third. Average backfat thickness in the foundation stock was 1.49 inches. This increased to 1.70 inches in third-generation fat-line Durocs, and decreased to about 1.33 inches in third-generation lean-line Durocs.

Researchers believe the difference in lean-to-fat ratio will become more pronounced as selection continues.

Selection Gives Long, Lean Hog or Short, Fat One

Results also showed that selection for low backfat has tended to increase length and height and decrease body width, while selection for high backfat has generally resulted in shorter, lower, and wider bodied hogs.

State agricultural experiment stations and private breeders, as well as USDA have been working for years to improve purebred hogs and develop superior cross-breds for efficient pork production. Selection for carcass quality in swine based on backfat thickness was started at Beltsville in 1954, an outgrowth of increasing interest in the meat-type hog. The Beltsville studies, part of this overall plan, are providing useful data on the value of selective breeding in producing meat-type hogs.

These studies will be continued as long as selection is effective in changing the lean-to-fat ratio.

Don't pay a "scare price" for hay, Vic Barcalow, University of Wisconsin agronomist, advises Wisconsin dairy farmers. He says, "There is a considerable quantity of hay for sale within his state or close by in neighboring states." Many farmers are short of forage this fall because of the unusually dry summer.

—Wisconsin Extension

Lepto Becomes A Major Threat

At the American Royal, breeding cattle and hogs had to be tested not only for TB and Bang's, but also for leptospirosis . . .

Condensed from Breeder's Gazette

IN 6 short years, leptospirosis has developed from an unrecognized cattle and swine disease to the stockman's No. 3 problem, ranking only behind mastitis and vibriosis. Since 1952, when it first came to public attention, lepto has been found in all 48 states, causing losses of more than $110 million a year.

Dr. Vladimir Dvorkovitz, president of Jensen-Salsbery Laboratories, Kansas City, offers these facts to help farmers take steps against lepto.

(1) Cause: In cattle and swine, leptospirosis is caused by a strain of pomona bacteria. It is carried by rodents, passed through the urine, and can contaminate water and feed. The bacteria usually enter the animal through cuts and bruises in the skin, and through the mucuous membranes of the mouth, nose and eyes.

(2) Symptoms: The most prominent symptom of leptospirosis is abortion, which may occur at any stage of pregnancy. Other symptoms include fever, loss of appetite, blood in the milk or urine, anemia, drop in milk production, hardened udders and weak newborn animals. This infection can be mild or fatal. These symptoms are also common to other diseases. Should any of these symptoms appear, consult your veterinarian at once.

(3) Control: Get the rodents. Their droppings and urine on feed and in water contain active infectious bacteria. Provide clean drinking water and food. Keep your cattle and swine away from water downstream from infected herds, a common cause of infection. Herds should also be kept away from damp, low spots. Break up herds into small groups, especially when leptospirosis is suspected. The bacteria spread rapidly in large, closely-confined herds. Vaccinate your herds.

Reprinted by permission from Breeder's Gazette, Columbia, Missouri

Since 1956, effective leptospirosis vaccines have been developed which give positive protection to cattle and swine. Vaccination with L. Pomona Bacterin is especially urgent to check the spread of infection in a herd, to protect animals moving into new areas where lepto bacteria may be present, and where pigs and cattle are fed together.

Have a veterinarian check your herd regularly. Blood tests can quickly detect lepto bacteria. Don't make the mistake of thinking that once your herds have had leptospirosis, the animals are immune. Some can become carriers of the disease, infecting the new animals in the herd.

Check yourself. Leptospirosis can infect man. Persons who contact infected animals and contaminated materials can contract the disease.

New Bull Semen Extender Cuts Artificial Breeding Costs

A new method for preserving and shipping bull semen promises to cut operating costs of artificial insemination programs.

Researchers at the University of Arkansas have developed a way of processing semen that reduces the number of collections and cuts shipping costs in half, reports Dr. O. T. Stallcup, dairy husbandman.

Basic principles of the discovery involve adding carbon dioxide and glycine to an extender composed of egg yolk, distilled water, antibiotics, and other ingredients. Carbon dioxide keeps the spermatozoa (male reproductive cells) alive in the absence of free oxygen. Glycine is an amino acid containing protein that protects and nourishes the spermatozoa. Another chemical called glutathione is added to activate the spermatozoa, when ready for use, thus increasing the period of time they can be stored successfully.

Field trials indicate that semen processed and shipped with this extender can be safely used for three to four days compared with two days for present extenders.

—University of Arkansas

How To Breed Dairy Heifers by Weight

Eliminate some calving problems and boost future milk production . . .

Condensed from Wallace's Farmer

BREEDING on a weight basis can eliminate many calving problems likely to occur with dairy heifers that are too small. It may increase future milk production, too.

"We have recognized the 'breed by weight' method for some time," says Robert Fincham, extension specialist at Iowa State College.

"Planning a breeding program on the basis of weight does present problems for many farmers. But it usually pays off."

Many cattle raisers haven't the facilities for weighing the heifers so they stick with breeding by age alone. This simply requires a record of birth dates. "Then, if the animal isn't stunted or unusually small, she will be bred at a certain age," says Fincham.

If scales aren't available, "taping" can provide some fairly accurate estimates on when the animal is ready for breeding.

In this case, "taping" means measuring the animal's heart girth. This method can also be used earlier to check the rate of growth.

"Results of taping will not always be accurate," points out Fincham. "Not all animals are normally proportioned. But it is a good guide in the absence of weights."

Breeding an animal too young will tend to check its growth. A heifer with normal size should freshen at about 2 years of age.

"A big cow within a breed is generally a more economical producer than a small cow," points out Fincham. Big animals usually can handle more forage.

Age at which a heifer may be bred varies with breed, too. Larger breed heifers, including Holstein and Brown Swiss, can usually be bred when they are from 17 to 19 months old.

Heifers of small breeds, Ayrshire, Guernsey, and Jersey will normally be of the proper breeding size when they are from 15 to 17 months old.

After calving, heifers who were bred too small will require extra grain if they are to make any more growth.

The small heifer will utilize feed for body maintenance and

Reprinted by permission from Wallace's Farmer, Des Moines 5, Iowa

milk production first. Then, when these two needs are cared for, some extra feed may promote growth.

Here's another reason why size is important. Cows will often produce an additional 20 pounds or more of fat per year for every 100 pounds of body weight.

Herbert Hoover, Mahaska county, Iowa, says he breeds his dairy heifers for fall freshening at an age of 23 months.

"If I get some spring calves, I often hold them over for breeding so they'll freshen in the fall." Hoover likes to have his herd come fresh between August and October.

Another Mahaska county farmer, Eves Cadwallader, says "When a dairyman is working for top production during certain seasons. it isn't practical to ignore freshening dates."

Cadwallader knows that breeding by weight is recommended. but feels that the problems outweigh the advantages for an average breeding operation.

Lyle Van Aukens, Keokuk county, Iowa, breeds his dairy heifers by age, too. "We like to breed as soon as possible after the animals are 15 months old."

Van Aukens estimates that his Brown Swiss heifers will weigh from 650 to 700 pounds at this age. "And we like to have the animals freshen about Sept. 1, too," he adds.

Overfeeding a heifer slated to freshen in a few months can be harmful.

In a test involving six twin heifers, one heifer in each pair was fed a normal ration and the other was fed a fattening ration.

After 6 months in milk, the overfed heifers averaged 16 pounds of milk daily while the animals receiving normal rations produced 19.7 pounds daily.

Fincham believes that some cattlemen are still following an old theory of breeding the first-calf heifers to a beef bull to produce small calves. This was thought to help avoid calving problems.

"But we know this is not true, now," says Fincham. "If the heifer is bred at the right age and weight, she'll have no distinct calving problems."

The chart below defines proper breeding weights and heart girth measurements of dairy breeds:

	Brown Swiss	Jersey	Holstein	Guernsey	Ayrshire
Weight in pounds	750	600	750	600	650
Heart Girth in inches	65	59	65	60	61
Normal Age in months	17	15	17	17	16

Charcoal from Your Woodlot

It isn't a simple project, but making charcoal may make money for you . . .

Condensed from
Iowa Farm Science

N. J. Hansen
Iowa Associate in Forestry

USE OF charcoal for outdoor cooking has increased rapidly since World War II. And the increase is estimated at more than 30 per cent per year.

Nearly all of the charcoal now used in Iowa and some other states is presently shipped in. The upland timber in this area, however, consists primarily of dense hardwoods such as oak, hickory and ash. These timber lands often have been "high-graded" — that is, the best trees cut, and poorer trees left standing. To improve the productivity and financial return of these degraded woodlots, the first step is to get rid of the poor trees to make room for good trees.

Charcoal can be made from low-quality dense hardwoods. Sound dead trees and tops or limbs are suitable for this use. Wood from 2 inches up to 10 or 15 inches in diameter and of any length can be used. Green round wood, however, should be seasoned at least 6 months—preferably a year or more.

If you own a woodland, it may be worthwhile to consider the possibility of making charcoal. An on-farm sideline business is one of several ways to help meet the cost-price squeeze.

Kilns:

Small charcoal kilns usually are built of stabilized concrete masonry block. Cinder block is recommended. Possible substitute materials include haydite, perlite and waylite blocks and fire brick. Kilns can be constructed to hold from 2 to 10 or more cords of wood. Materials and labor amount to around $150-$200 per cord of capacity. Kiln life ranges from approximately 100 - 200 "burns." Each burn requires 5-10 days for loading, firing, cooling and unloading.

Reprinted from Iowa Farm Science, published by Iowa State College, Ames, Iowa

Yield:

A cord (128 cubic feet) of seasoned dense hardwood yields around 800-1,000 pounds of charcoal. About 10 per cent of this will be "fines"—unsuited for cooking but useful in cistern filter systems. Most big sticks of wood break up readily after charcoaling, but some large lumps need to be broken down by a cracking device. Likewise, a screening method is advisable to eliminate fines and to provide a more uniform size of lump.

Packaging:

Charcoal must be packaged in some manner for the retail market. Ten-pound bags are the most common size sold, and color-printed multiwall kraft bags are most often used. Such a bag in quantities of 5,000-10,000 would probably cost 8-10 cents each. Cardboard boxes are stronger and ship better but usually cost more than bags. Where competitive merchandising isn't a problem, secondhand paper flour or feed sacks can be used; these hold from 20-25 pounds of lump charcoal. But package attractiveness is important in grocery or drug stores where customers choose goods from display counters.

Marketing:

There are several methods of marketing charcoal. The small producer may be able to market his production in the local community by selling directly to retailers or directly to customers. The larger producer might have to reach out 50 or 100 miles from his plant — perhaps developing a regular delivery route or selling to wholesale houses.

Many types of retail outlets handle charcoal. Formerly fuel and lumber dealers and hardware stores were the major outlets. Now, grocery stores are leading the field in sales volume. Mail-order houses, sporting goods stores, service stations, etc. also retail charcoal.

A survey of charcoal marketing in Iowa in 1955 showed that per capita sales were highest in communities of 5,000-10,000 population. Total buying then amounted to about ½ pound per person; this has probably increased to about 1 pound or more now. In the New England states, where interest in outdoor cooking developed earlier, buying amounts to better than 2½ pounds per person. Use in Iowa will probably continue to grow with the popularity of outdoor cooking.

Estimates of wheat yields for 1958 are set at 1,446 million bushels. Last year's production is being exceeded by 53 per cent.

The average retail price for briquette charcoal in 10-pound

bags is 10 cents per pound but varies from 8 to 12 cents. Retailers usually pay from 5 to 8 cents per pound delivered at the store in bags. The wholesale value of unpackaged bulk charcoal is around 2 to 2½ cents per pound. The cost of packaging lump charcoal might vary from 1 to 2 cents per pound, and distribution costs might range from 1 to 2 cents per pound.

Briquette or Lump?

Most of the charcoal sold in Iowa is the briquette type. Briquettes are made by crushing lump charcoal into "fines," mixing it with water or steam and a binding agent and reforming the mix under pressure. This makes a dense, uniform piece of charcoal. However, briquetting plants are relatively expensive.

Lump charcoal can be used for cooking just as well as briquettes. People in this area, however, are accustomed to buying and using the briquette form; the lump charcoal doesn't sell as readily as briquette at the present time. At the same time, customers are price conscious, and it appears that many people would be attracted to buying lump charcoal if offered at a lower price than briquettes. Also, the "natural and unchanged" appearance and "farm-produced" form of lump charcoal might form the basis of a merchandising program.

Plants:

Charcoal plants could be established in several ways. You might furnish your own wood and operate your own kilns on a part- or full-time basis. This would be a small operation confined to local retail outlets. Existing farm equipment would be used for harvesting the wood and handling the charcoal. Advantages include nearness to local market and relatively low investment and production costs. Possible disadvantages: insufficient experience or skill to make consistently good-quality charcoal, limited market outlets, inability to provide suitable packaging for competitive merchandising and distraction from other farm activities.

U. S. Government figures show Americans spend about ten billion dollars each year for alcoholic beverages. That is about five times as much as they donate to all churches, and about twice the amount they spend educating their children.

Another method would be for a number of individuals to produce charcoal on their farms and to sell it in bulk to a processor with facilities for packaging and marketing the product in briquette or lump form.

A third possibility would be in the operation of a battery of

kilns, with wood coming from farms within a 10- or 15-mile radius. This would be a relatively large—and, perhaps, a cooperative—operation producing enough charcoal to take advantage of large-scale packaging and marketing practices.

Success:

Economic considerations are important in thinking about producing or marketing charcoal. Quite a lot of labor is involved in turning wood into charcoal. Economic success or failure would depend to a large extent on degree of mechanization and management. We do not have enough information available to indicate whether local producers of lump charcoal can compete successfully with the briquette manufacturers. We are presenting what information is available, because many people have been inquiring about charcoal production and marketing.

Remember that a cord (128 cubic feet) of seasoned round hardwood yields from 800 to 1,000 pounds of charcoal. At present charcoal market prices, the small operation isn't likely to be feasible if wood hauled to the kiln costs more than $8-$10 per cord. The table illustrates an ap-

Adequate protection from severe winter winds is very important for colonies of bees. Hives should face south or east and entrances should be reduced and fitted with mouse guards.

Possible Costs and Returns per Cord of Wood for Bulk Charcoal at the Plant

850 pounds, charcoal	YIELD	850 pounds, charcoal
$17.00 (at 2c per pound)	WORTH	$21.25 (at 2½c per pound)
	COST ITEMS	
$ 9.00	Wood delivered at kiln per cord	$ 9.00
0.45	Interest on wood, 1yr. at 5%	0.45
1.25	Depreciation of kiln per cord	1.25
10.70	TOTAL	10.70
$ 6.30	BALANCE	$10.55
6.75	PROCESSING LABOR (5 hours per cord at $1.35 per hour)	6.75
—0.45	PROFIT	3.80

proximation of the costs and returns per cord of wood for bulk charcoal at the plant.

Some of the possible expense items not included would be property taxes, equipment operation and depreciation, land rent and supervision. As the table shows, at a rate of 2 cents per pound for bulk charcoal, the operation might result in a loss unless wood is obtained for less than $9 per cord or if labor is charged at less than $1.35 per hour. If bulk charcoal is worth 2½ cents per pound, however, then a good return appears possible if wood can be obtained for near $9 per cord. Here, investment per cord of wood is $10.70 for wood, kiln depreciation and interest, and $6.75 for processing labor—making the total cost per cord $17.45. The return over costs is $3.80 per cord, or a margin for profit and risk of about 20 per cent.

In considering charcoal production, think carefully about what your probable cost of production would be. Likewise, check on possible market outlets to find out if and how much they are willing to buy and at what price and type of package.

More Hogs, Broilers Seen for Next Year

Fourteen per cent more hogs, and 10% more broilers will pace increases expected for most classes of livestock in every major section of the country during the next 12 months.

So reported the feed survey committee of the American Feed Manufacturers Association in Chicago. The Committee, whose 1957 report was accurate within 2% of actual feed use, also said that increased supplies of high protein feeds and an abundance of grains and mill feeds will be more than ample to feed the increased livestock numbers.

In addition to increases in hogs and broilers, 5% more turkeys, 4% more sheep and lambs, and 3% more beef cattle and layers are expected next year. Declines of 2% for dairy cows, 4% for horses and mules, and 6% for other chickens raised for flock replacements are anticipated.

If estimates of the committee are realized, the 1958-59 period will be the third year of expansion in the current cycle. It will provide consumers with one of the largest total supplies of meat, milk, eggs, and other livestock products ever experienced.

—Virginia Polytechnic Institute

Parasites Can Eat Up Pig Profits

A review of different swine parasites and latest information about their control . . .

Condensed from Nebraska Farmer

Dr. George Kelley, Jr.,
University of Nebraska

ARE part of your pig profits going down the drain—eaten up by parasites?

Worms, lice and mice are constant threats to your pigs. These parasites require a constant supply of food—food which should be used to produce pork.

Worms cut down on pork production by robbing food from the pig, by injuring the pig's body while penetrating various organs and by constantly irritating the wall of the gut. Lice and mites slow down gains by sucking the pig's blood and also by irritating the skin, which "worries" off weight.

Since each parasite is passed from one pig to another in a different way and has different effects on the animal, each one requires a separate method of control.

The large roundworm is the most common worm found in swine. This is the worm which is usually found in the pen with the pigs. It resembles a large earthworm and can get up to 10 inches long.

Large Roundworm

The large roundworm lives within the small intestine of the hog, where each female produces up to 2,000,000 eggs each day. These eggs pass along the gut and are passed out with the dung. A tiny worm develops within the egg after it lies on the ground for a few weeks. The egg is then ready to hatch into a worm as soon as it is eaten by the pig.

When eaten, the egg hatches when it reaches the small intestine of the pig. The tiny worm must then take a trip through the pig's body before it is able to settle down and grow up. It penetrates the gut wall and burrows through the liver until it reaches a blood vessel leading to the heart. From there the heart pumps the worm into the lungs where it penetrates the air sacs, works its way up the windpipe and is swallowed for the second time.

Reprinted by permission from Nebraska Farmer, Lincoln 1, Nebraska

The worm stops when it reaches the intestine for the second time—about 60 days from the time the egg was eaten—begins laying millions of eggs each day to start the cycle again.

Control of the Roundworm

The source of the eggs must be removed in order to control the large roundworm. Effective worming programs can eliminate the egg-laying worms from the pig's gut and thus break the life cycle of the roundworm.

No worms should be allowed to mature; hence the worming treatment must be applied at least every 60 days—the time required for an egg to hatch and grow into a mature worm. Choice wormers are sodium fluoride, piperazine and hygromix.

Sodium fluoride is a single-shot treatment—it must all be given in one dose. It is a very cheap wormer but it is somewhat poisonous and so must be handled carefully.

One pound of sodium fluoride should be mixed with 99 pounds of dry feed. This ration should be fed for only 1 day. Any medicated feed remaining should be disposed of or thoroughly mixed into the following day's ration.

Hogs don't like the taste of sodium fluoride. Therefore they won't eat as much feed as they usually do. So you only need to mix the wormer with about two-thirds of the usual ration. Feed mixed with sodium fluoride must be given dry or poisoning is apt to result.

The *piperazines* are extra safe wormers. They are relatively non-toxic to pigs, other domestic animals, and humans. They are also one-shot wormers and can be mixed with either feed or drinking water for administration. It's important that the entire dose be eaten rapidly; therefore the pigs are generally starved for 18 to 20 hours before giving them the medicated feed. These wormers are very effective, but are rather costly.

Dairy cows will take an average of 10 drinks a day if they have free access to water in tanks or in pressure bowls.

Both sodium fluoride and the piperazines are one-shot treatments which must be given every 60 days to be sure that no worm eggs will be shed. However, now it is possible to use a newly introduced treatment that is fed continuously in the diet. This antibiotic drug is named hygromycin B—sold as a pre-mix called *hygromix*.

Hygromix has a wide margin of safety and prevents the development of worms—and therefore worm eggs—when fed continuously. The pre-mix is added to the ration at the rate of 5 pounds

per ton of feed. Cost is somewhat lower than the piperazines, considerably higher than sodium fluoride.

Swine Lungworm

The swine lungworm is probably the second most important worm. It lives in the air tubes of the hog's lungs where it produces constant irritation, leading to severe coughing.

The females lay eggs while in the lungs. These eggs are coughed up the windpipe into the throat and are swallowed. They pass through the stomach and intestine unaffected and are expelled in the dung.

Such eggs must be eaten by an earthworm and the earthworm in turn eaten by a pig, before the eggs can infect another pig. Thus control of lungworms depends on the elimination of earthworms.

About half of our pork comes to us as cured pork; formerly this was done as a preservative measure, but now it is chiefly a flavor-adding process.

Earthworms can be eradicated by two methods: Either cover the soil with a concrete slab, or treat the soil in the pens with chlorodane or some other substance which kills earthworms. These worms are most abundant in fence rows so these spots require careful treatment.

The only treatment that will kill the worms once a pig is infested is a newly introduced wormer called *Dictycide.* However, this wormer is available through veterinarians only.

Lice

The hog louse is the largest bloodsucking louse that preys on domestic animals. These insects are brownish grey in color and can easily be seen traveling sideways over the skin of an infested pig. Hogs are the only animals on which this louse will live; one louse may spend its entire life cycle on the same pig.

The lice feed by sucking blood. Each puncture bite produces irritation and itching and as the animal scratches these spots he rubs the area raw which, in time, may result in large skinned regions. The blood loss and the irritation produced by the biting lead to a poor condition and slower gains in the infested animal.

The female louse lays 3 to 6 eggs daily, attaching them to the bristles of the pig. She will produce about 90 eggs during her lifetime of about 35 days. The eggs hatch 12 to 20 days after they are laid. The tiny lice begin sucking blood at birth and often can be seen in clusters feeding on the tender skin of the armpit, flank and belly of infested pigs.

The lice move from one pig to another readily; however, they

don't exist very long in empty pens. As a result, animals seldom acquire lice from contaminated premises.

BHC (Benzine Hexachloride) and Lindane—a 0.06% concentration of gamma isomer—or toxaphene at 0.5% concentration applied either as a dip or a spray will kill all of the lice on the body of the pig. Although these chemicals have no effect on the eggs, they usually last long enough to kill any young lice which hatch from eggs present at the time of treatment. However, it's a good policy to apply a second treatment 10 to 14 days after the first in order to kill any lice which may have escaped.

Mange

Mange is caused by a tiny mite which burrows into the skin. The female mites live in these burrows and lay eggs. In 3 to 10 days these eggs hatch and the newly born mites crawl to the surface of the skin to locate sites for their own burrowing. A new generation of mites can be produced about every 15 days.

The burrowing causes irritation, itching, inflammation and swelling. An intense itching causes the mangy animals to rub the infested areas raw. This constant injury causes the pig's skin to become thickened, wrinkled, hairless and crusted over with hard, clinging scabs.

BHC is the choice drug for treating hogs infested with mange mites. Dipping is the most effective way of giving the treatment but spraying—if done carefully—is also highly effective. In cold and inclement weather, mange — and lice — can be controlled by dusting the pigs and their bedding with 1% gamma isomer BHC or Lindane.

Plastic Material Makes Plows Work Better

Research workers in Hawaii are experimenting with Teflon as a coating for plow bottoms. Teflon is a plastic material with a "slippery surface." On plow bottoms it reduces the coefficient of friction between plow and soil and prevents sticking in soils with a high colloidal clay content. Results thus far in tough-plowing Hawaiian soils have been good. In some cases, plowing time was cut in half as a result of fewer stoppages and reduced draft. The plastic was attached to the surface in sheets or applied as an enamel coating. Teflon wear is a problem in soils with some abrasiveness. Tests are being run to determine Teflon's effectiveness in soils in the United States. *—Farm Management*

They're Hot on Hybrids

Some crossbreds wean more pigs and make more pork; but it's not a sure thing . . .

Condensed from Farm and Ranch

Bob Nichols

HOG breeders have known for a long time that crossbreeding can be a way to get larger litters, faster-gaining pigs and even better hog carcasses.

They've also known that it's not a sure thing—some crossbreds do better than their parents, some don't. The trick is in knowing *how* to use crossbreeding — plus shrewd selection of individuals for breeding stock—to speed up the job of improving the herd.

Texan Sam Rabb, Llano County, breeds both purebreds—mostly for sale as "club" pigs—and crossbreds—for fattening out on his own place. He usually keeps no more than a dozen sows, but he scouts the country for top-gaining, top-quality boars for each step in his rotational crossbreeding program. This is how it works:

● He starts with carefully-selected, meaty Duroc sows, bred to a certified (or, at least, an exceptionally meaty, good-gaining and efficient-feeding) Poland China boar. This Duroc-Poland mating is continued as long as the sows' peak productivity lasts.

● The best gilts from these Duroc-Poland matings are kept back for breeding to a purebred Landrace or Tamworth boar. This boar is as carefully selected as the Poland boar was. Whether a Landrace or Tamworth boar is used depends on where Rabb can locate the kind of boar he wants; he's looking for quality, not for breed.

● After these Duroc-Poland sows have produced several litters, they're replaced with some of their best female offspring. These Duroc - Poland - Landrace (or Tamworth) gilts are bred to a choice purebred Hampshire boar. Then gilts from *their* litters are used to start the cycle over again, being bred back to a Poland boar.

Besides getting increased hybrid vigor with each new stage in the crossbreeding rotation, Rabb finds that he's getting some good breed-quality "extras" from each breed that no one breed furnishes by

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itself.

In Oklahoma, breeder Tenys Parr, Garvin County, figures it about the same way. He first develops his own line-bred (purebred) Duroc gilts for the foundation herd, all selected for size, length and inherited milking ability. He breeds them to a line-bred Berkshire boar he has produced and selected for efficient feed conversion and apparent meaty quality.

The best Berkshire-Duroc gilts from this first cross are then bred to a certified Hampshire boar. These two-way-cross pigs, Parr concludes, have the desired dressing percentage from their Berkshire parentage, milking characteristics and prolificacy of the Durocs and uniform color and grazing ability of the Hampshires. The pigs are all-black or Hampshire-marked, so nobody can object that they look like mongrels or aren't uniform enough in a load.

At Arkansas Agricultural Experiment Station, livestock researcher Paul Noland has been finding out just how crossbreeding can be used to produce the best kind of hogs. Knowing that some crossbreds do well and some don't, he has started with individuals from selected *inbred lines* of each breed.

The lines are ones known to have superior qualities for their breed, and are from well-established sources. That's so any breeder who likes the results of one of the matings Noland uses can go to the same source, pick individuals from the same purebred line, and be reasonably sure that the crossbreeding results he gets would be about the same, if there's not much difference in environment and ration. Just crossing the same breeds might not get the same results at all.

Noland points out, however, that there are still a lot of differences between *individuals* within these lines. Two boars from Oklahoma State University's Line 3 Durocs would perform very similarly, for example, but pigs from one boar might still do much better than pigs from the other. Individual selection still makes about as much difference as *line* selection.

Soil cannot be considered as soil alone. People live on it. They own it, rent it, plow and cultivate it, harvest its crops, and live upon the fruits of harvest. When the soil fails, people suffer.

The Arkansas experiments were begun with sows from the station's own Uark Poland China line—a highly inbred line. Boars used were Beltsville No. 1, Duroc Line 3 and Hampshire Line 5 from Oklahoma State University;

Minnesota No. 2, from the University of Minnesota; and Landrace. Each boar was bred to several sows, to get from three to six litters of each crossbreed mating.

Some of these two-breed crossbred gilts were then bred to boars of still different breeds, as the second stage in the rotational crossbreeding program. Boars used were Minnesota No. 1, Yorkshire, Beltsville No. 1, Hampshire Line 5 and Duroc Line 3.

Gilts from this cross were bred to boars of another breed (or line), and so on, through six generations. Pigs of the sixth generation had six or seven different breeds or lines in their ancestry.

Here are things Noland has found out so far:

- Some of the best crossbreds have reached 200-pound weights in 123 days—at just over 4 months of age!
- Crossbreds out of a Beltsville No. 1 sire have been among the top litters by all measures.
- Among the first-generation (two-breed) crosses, Duroc-Polands ranked highest when everything was considered: their own gaining ability, the mothering ability of the gilts kept for the next cross and the growthiness of the pigs produced by these Duroc-Poland gilts.
- In the next generation (three-breed) crosses, pigs out of the Duroc-Poland gilts and a Beltsville No. 1 boar ranked best in gaining ability and carcass value. And, everything considered, pigs out of these gilts and the Hampshire Line 5 boar did

How You Can Use Crossbreeding In a Small Herd

First Generation

Start with selected gilts of one of the common breeds having most of desirable characteristics, such as Duroc. Breed to meatiest purebred or certified boar you can afford, of another desirable common breed, such as Poland China or Hampshire.

Second Generation

Backfat probe and select best of these second-generation crossbreds when you choose the replacement stock for the herd. Breed to best purebred or certified boar you can afford which has outstanding carcass quality, such as Landrace or Yorkshire breeds.

Third Generation

Backfat probe and select best of these third-generation crossbreds when you choose the replacement stock for the herd. Breed of boar to select to breed these third-generation gilts depends on characteristics that are lacking. If gilts show poor prolificacy, breed to boar or breed that is high in prolificacy, etc.

Fourth Generation

These fourth-generation crossbreds should have more vigor and quality than any of their ancestors. Either discontinue line here, and go back to first generation to start crossbreeding over again or breed best gilts from this mating to type of boar used for first generation.

next best, but the Minnesota No. 1 boar did about as well. Pigs from all three of these crosses rated only fair in carcass length and backfat thickness, however. (Not all crosses were carried through several generations.)

● Some disadvantages naturally show up in some multiple-breed crosses. For example, gilts of this second generation, out of the Minnesota No. 1 boar and Duroc-Poland sows, were *poorer* mothers than their dams and *lower* in carcass value.

In the third generation (four-breed) crosses, the Landrace boar mated to Minnesota No. 1-Duroc-Poland females produced the fastest-growing pigs, with satisfactory carcasses for length and backfat. But their carcasses didn't rate so well in yield or primal cuts.

Use a Fourth Breed

● Continuing to spread the cycle, by bringing in a fourth breed for this generation, got better results than returning to a breed already used. Using a Poland China boar on these Minnesota No. 1-Duroc-Poland gilts produced pigs that weren't as good-gaining as when a boar of an altogether different breed was used, but did rate higher in carcass quality.

● Generally, there was some improvement each time a new breed was brought into the cross —especially when the boar of the new breed was strong in some quality that wasn't strong in the females. This held true even up into six-breed crosses. So, Noland is now introducing a different breed—Spotted Poland China—into the crossbreeding program to try to extend the benefits of hybridization still further.

How much advantage can you expect, year after year, from a well-planned crossbreeding program? Expert swine breeders point out that crossbreeding is only *one* way to improve hogs, and that you can get "hybrid vigor" even by "crossing" between unrelated lines of the *same breed*.

Forecasts of per-capita meat consumption in the U. S. indicate that for 1958 the figure will be about 150 pounds, considerably below the record 166.7 pounds set in 1956.

Average Advantages

But the records of *several thousand* crossbred and purebred litters at the regional swine breeding laboratory at Ames, Iowa, show these average advantages for the crossbreeds:

Number of pigs weaned per litter: 7.2 (Average for the purebreds: 5.9 pigs weaned per litter).

Total average advantage of crossbred litters over purebreds (considering litter size, rate of gain, etc.): approximately 25%!

The Dairy Cow and a Balanced Ration

Low protein roughage needs high protein grains and vice versa . . .

Condensed from Butterfat

J. A. Mace,
Superintendent Dairy Herd Improvement

ALL animals (including humans) thrive best when their feed requirements are adequately, but not excessively met.

This simply means that a horse standing idly in the barn needs a different kind and quantity of feed to remain in good health than one which is working hard every day.

It also means that a good cow, producing heavily, needs more feed of a higher protein content than a poor cow. It means that the same good cow needs more feed to meet her requirements when producing heavily than she does later on in her lactation when her output of milk has dropped by half or more.

Fortunately, a dairy cow is adaptable in that there is a wide choice of feeds which meet her requirements and, as long as those requirements are met, she does not apparently care too much whether they come from alfalfa or clover or grass, hay or silage or what mixture of grains are used to fill out her ration.

The base of a balanced ration for a cow is of course the roughage (hay or silage) available on the farm. She is so constructed that she can efficiently convert roughage to her needs. Naturally, good quality hay or silage will do a better job than poor, and it follows that to supply her needs, supplementary feeding will be different when feeding different qualities of roughage. A cow should receive all the hay and/or silage she will eat, and should receive some hay (at least ½ lb. per 100 lbs. live weight) even with large quantities of excellent silage.

A dairy cow has two separate and distinct feed requirements. One is the feed required to keep her alive, in good flesh and in good health. This is called a maintenance requirement and is

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the same for a good or a poor cow. It differs from cow to cow purely on the basis of size and can be regarded as the overhead charge in keeping the cow on the farm. The state and stage of pregnancy can also be regarded in the same light since size is the governing factor in food needs. Her other feed requirement is for milk production and this will vary widely from cow to cow and also during an individual cow's lactation. It varies with the quantity of milk produced and also with the butterfat test of that milk.

Basically, these feed requirements can be broken into two groups—carbohydrates (including fats) and protein. Simply stated, the carbohydrate group provides the fuel for energy, heat, body processes and assists in the formation of meat, muscle, milk. The protein group provides balance in these activities, particularly in the production of meat and milk. Both of these groups must be in the cow's feed in the correct proportion to her need, for the highest economical production of milk.

Under-feeding of either group will certainly result in lower milk production and probably in loss of flesh and even poor health. Over-feeding of carbohydrates is expensive and increases the cost of producing milk but the cow can at least store some of this extra feed in her body as fat. Over-feeding of proteins is not only wasteful and very costly, but may cause actual harm since the cow cannot store it, and therefore must excrete the excess daily.

A rough guide then to feeding a balanced ration would be: large quantities of high protein roughage such as alfalfa, clover, hay and/or silage, or large quantities of pea or early cut grass silage, etc., should certainly be fed, but in combination with low protein grains such as oats or barley to fill out the needs of the cow.

Jet engines on airplanes seem to work better at cold temperatures than at hot.

Low protein roughage such as late cut hay or silage, oat or timothy hay should be accompanied by higher protein grains such as linseed oil meal, soybean, bran, etc. The ordinary run of mixed clover and grass hay with corn silage generally needs a grain mixture which will yield around 15 to 16% crude protein. In other words, grain fed with early cut high protein roughage should run around 14-16% protein, fed with low protein roughage should run around 18%.

Feeding a balanced ration means (1) Most profitable milk production. (2) Longest lifetime production. (3) Improved reproduction.

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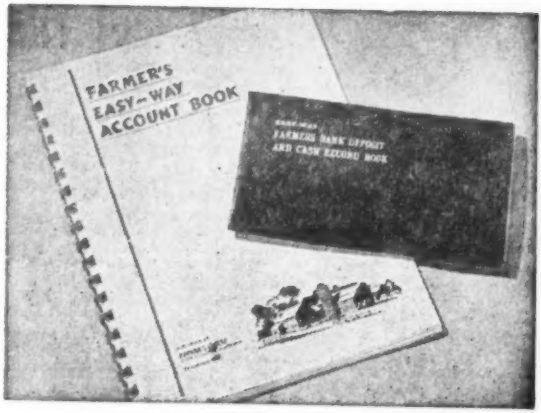

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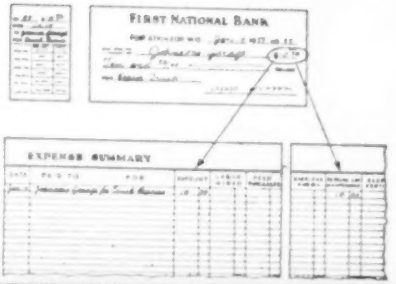

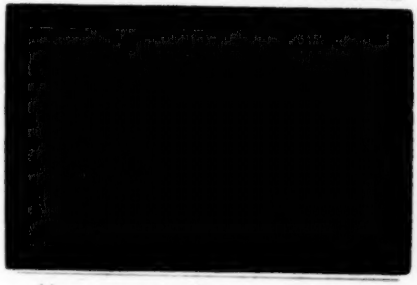

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